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JOURNAL INFORMATION

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(Editorial policy continued on inside back cover)

Cover Photo: Spadefoot Toad, *Scaphiopus holbrookii* (see p 3).

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Contents

Eastern Spadefoots in Virginia: Summary of Observations Collected from the VHS Spadefoot Reporting Link and iNaturalist
Jason D. Gibson 3

2022 Lake Anna Survey: Lake Anna State Park, Spotsylvania County Virginia
Matthew Neff and Travis Anthony 17

Geographic, seasonal, habitat and climate factors impacting prevalence of anuran species during Virginia Herpetological Society surveys between 1991-2022
Jason D. Gibson 25

Field Notes 38

President's Corner 62

Minutes of the Fall 2022 VHS Meeting 64

Treasurer's Report 67

John White, Toad

Eastern Spadefoots in Virginia: Summary of Observations Collected from the VHS Spadefoot Reporting Link and iNaturalist

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Abstract: The Eastern Spadefoot is being found to be less secretive and more widespread than once thought. Since the first VHS Eastern Spadefoot reporting link was published in 2019, we have continued to gather data submitted by citizen scientists from around the state of Virginia to gain a better understanding of this species. In this second summary, 81 observers reported 91 observations of Eastern Spadefoots. We additionally summarized 143 iNaturalist observations of this species which have been made since 2016. Six county records and 2 city records were reported. Additionally, there were 68 county and 9 city confirmations. The earliest recorded activity was 5 January and the latest was 30 December. Eastern Spadefoots were found to be active every month. Most observations were made in the months of May through August with August being the month with the most reported observations. Calling males were heard April through August with August being the month with the most males reported calling. In this paper we also report habitat, distributional, and other phenological data.

Keywords: *Scaphiopus holbrookii*, citizen science, iNaturalist, smartphone

INTRODUCTION

The invention of the smartphone has been a game changer for understanding the distribution of amphibians around the world. The smartphone, with its camera, digital recorder, and ability to connect to the internet allows anyone anywhere to record an observation of a species. Today an observer can utilize many ways to report these observations. The Virginia Herpetological Society has a Facebook page with an animal identification email address (id@virginiaherpetologicalsociety.com) (many of these observations turn out to be county/city records which are then referred to the editor of Catesbeiana who then publishes these records) and an Eastern Spadefoot reporting link. People not familiar with the VHS can utilize iNaturalist or HerpMapper. The advantage of any of these online platforms is the ease with reporting observations. Distributional records in the past were predominantly done by semi-professional or professional herpetologists who collected a specimen and preserved it in a museum, reported distributional observations to VFWIS database (via an annual collecting report) or by taking a voucher specimen or photo and then writing this observation for publication in Catesbeiana or Herpetological Review. Most citizen scientists in the past did not have the time, interest, or expertise to write up such field notes and therefore were unlikely to contribute to distributional records. The evidence that online reporting is making a huge contribution can be seen in the uptick of published field notes in Catesbeiana and the huge number of submitted observations on iNaturalist. At the time of the writing of this manuscript, iNaturalist had 283,645 identifiers reporting 123,299,853 observations of 407,016 species.

The Eastern Spadefoot was until recently considered a secretive species. This species has been shown, through the VHS Eastern Spadefoot Reporting Link and iNaturalist, to be more common, widespread, and active than previously thought. On warm rainy nights these frogs can often be found on roads, in swimming pools, and in people's yards. Although calling males are being frequently heard and reported, observations regarding the nature of their actual breeding and egg-laying remain rare.

The purpose of this paper is to summarize the observations reported to the VHS Eastern Spadefoot Reporting Link from July 2019 until December 2022, summarize all the observations made on iNaturalist from the first reported observation for Eastern Spadefoots until the end of 2022, and to report any new distributional records or natural history information published in the literature from 2019 until December 2022. From this information, we created an updated map of Eastern Spadefoot distribution in Virginia (Figure 5) and summarized all new natural history information.

MATERIALS AND METHODS

Virginia Herpetological Society Eastern Spadefoot Reporting Link methods

Starting in July 2019 we posted an Eastern Spadefoot reporting link to the VHS

homepage to allow VHS members and other interested citizens to document observations on spadefoots in Virginia. This link replaced the poster we used in a previous study (Gibson and Anthony, 2019). This link connects the observer with a Google form and allows them to enter their name, email address, date of observation, time of observation, specific location of observation, county or city of observation, breeding chorus data, and comments. To confirm the observation the link allows for a picture or sound file to be uploaded. Data were collected from July 2019 until December 2022. We viewed, confirmed, and then processed 91 observations from 81 observers. Potential county and city records were verified by viewing the most up-to-date VHS Eastern Spadefoot range map (Figure 1), the Virginia Fish and Wildlife Information Service Database (FIWS), and Vertnet.org.

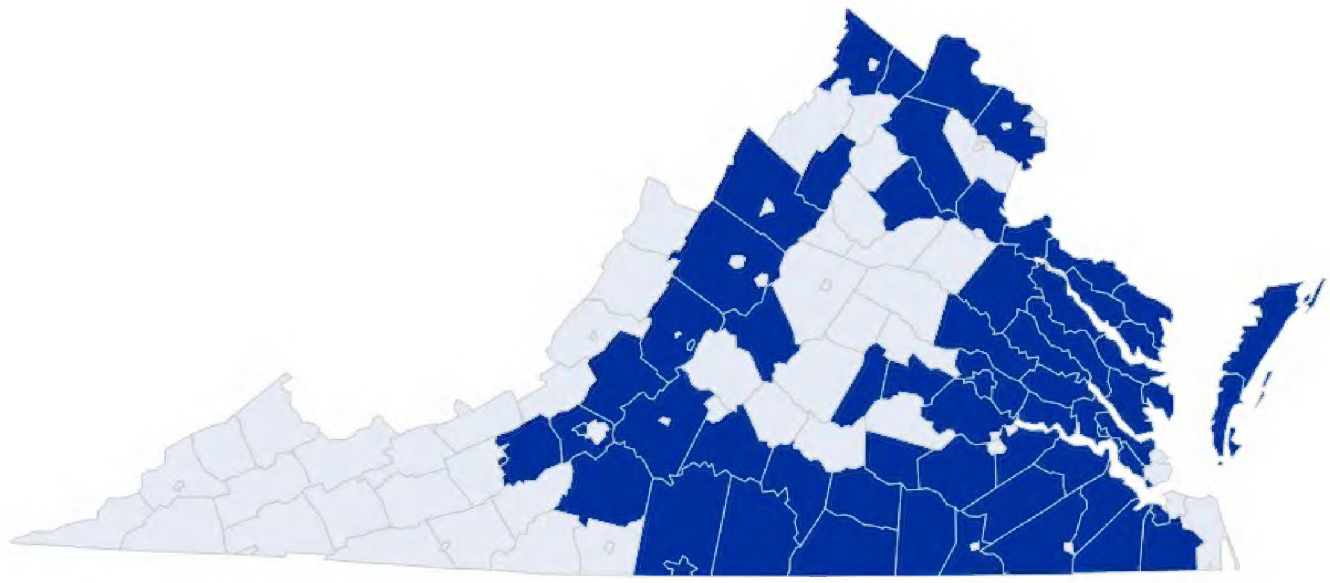

Figure 1. VHS county/city record map for Eastern Spadefoots in Virginia. (Accessed 10 December 2022 http://www.virginiaherpetologicalsociety.com/amphibians/frogsandtoads/eastern-spadefoot/eastern_spadefoot.php)

iNaturalist (http://www.inaturalist.org) methods

From the iNaturalist website we viewed and processed all Eastern Spadefoot entries from June 2016 until November 14, 2022 in Virginia from the inception of this website. During this time period 203 observations were posted from 100 observers. We viewed every observation and recorded the county/city where the spadefoot was found, the month of observation, and any other natural history information included in each post. Of the 203 observations we were able to use 143 for this paper. Some of the 203 observations were repeats, some we were not able to verify from the photos, and others were of eggs or tadpoles. We did not use observations posted of eggs or tadpoles as we did not feel comfortable with ensuring proper identification. We contacted all observers whose observations were new locality records to ensure validity and to get permission to put their photo in the VHS digital archive.

Review of the literature and other databases

In addition to the VHS spadefoot reporting link and iNaturalist, we also accessed the VertNet database (http://www.vertnet.org), HerpMapper (http://www.herpmapper.org), VAFWIS database, and Global Biodiversity Information Facility (http://gbif.org). Literature sources were also searched from 2019 until 2022. We viewed all issues between these dates from Herpetological Review, Catesbeiana, Journal of Herpetology, Herpetological Conservation & Biology, Northeastern Naturalist, Southeastern Naturalist, The American Midland Naturalist, and Banisteria. We also conducted a Google Scholar search for articles pertaining to Eastern Spadefoots.

RESULTS

VHS Spadefoot Reporting Results

The VHS Eastern Spadefoot link documented observations of spadefoots from January through October with no observation reported in November and December. The earliest observation was on 5 January 2021 and the latest was 26 October 2021. Most spadefoots were reported to be seen in August; most observations were made from May through August (Figure 2). In these records, the earliest calling males was heard on 7 April 2022 and the latest was heard on 16 August 2020. August was the month with the most reported calling males (Figure 3). Spadefoot metamorphs were reported coming out of breeding pools on 17 April 2021 in Gloucester County (at this same location metamorphs with tails were still observed in the breeding pool), 12 July 2021 in James City County and 14 and 15 August 2020 in Fairfax County. Amplexus was reported on only two dates, 21 May 2020 and 9 June 2020 in Powhatan County. Egg laying was observed in the City of Salem on 21 May 2020, this was the only report of eggs being deposited. Spadefoots were found in a variety of habitats, the top three being surface active frogs in people's yards, frogs trapped in swimming pools, and frogs dug up in soil around a person's yard (Figure 4).

Observations came from 35 counties and 7 cities (Table 1). Gloucester County had the highest number of observations for counties with thirteen submitted observations and the city of Richmond had the highest number of observations for cities with four submitted observations. Four new county records were reported including Fluvanna (Kathryn Ricotta) (VHS digital archive #713), Goochland (Nancy Rusinak, Heather Gillespie) (VHS digital archive #714,710), Louisa (Rebecca Emmel) (VHS digital archive #709), and Orange Counties (David A. Traud, Lucy Colby) (VHS digital archive #'s706, 708). Two city records were recorded including Franklin (Wendy Harrison) (VHS digital archive #712) and the City Hampton (Cody LaBarge) (VHS digital archive #707). Additionally, there were 30 county confirmations and 5 city confirmations (Figure 5).

One adult spadefoot found in Chesterfield County on 30 May 2020 was observed to have a missing eye (Figure 6). Four Eastern Spadefoot deaths were reported in swimming pools on 19 June 2020, 13 August 2020, and 26 October 2021. Spadefoots were observed

in Salem being killed by Ravens and Grackles (Kelly Clinevell personal communication). The birds specifically targeted eating the eyes and tongues of the frogs.

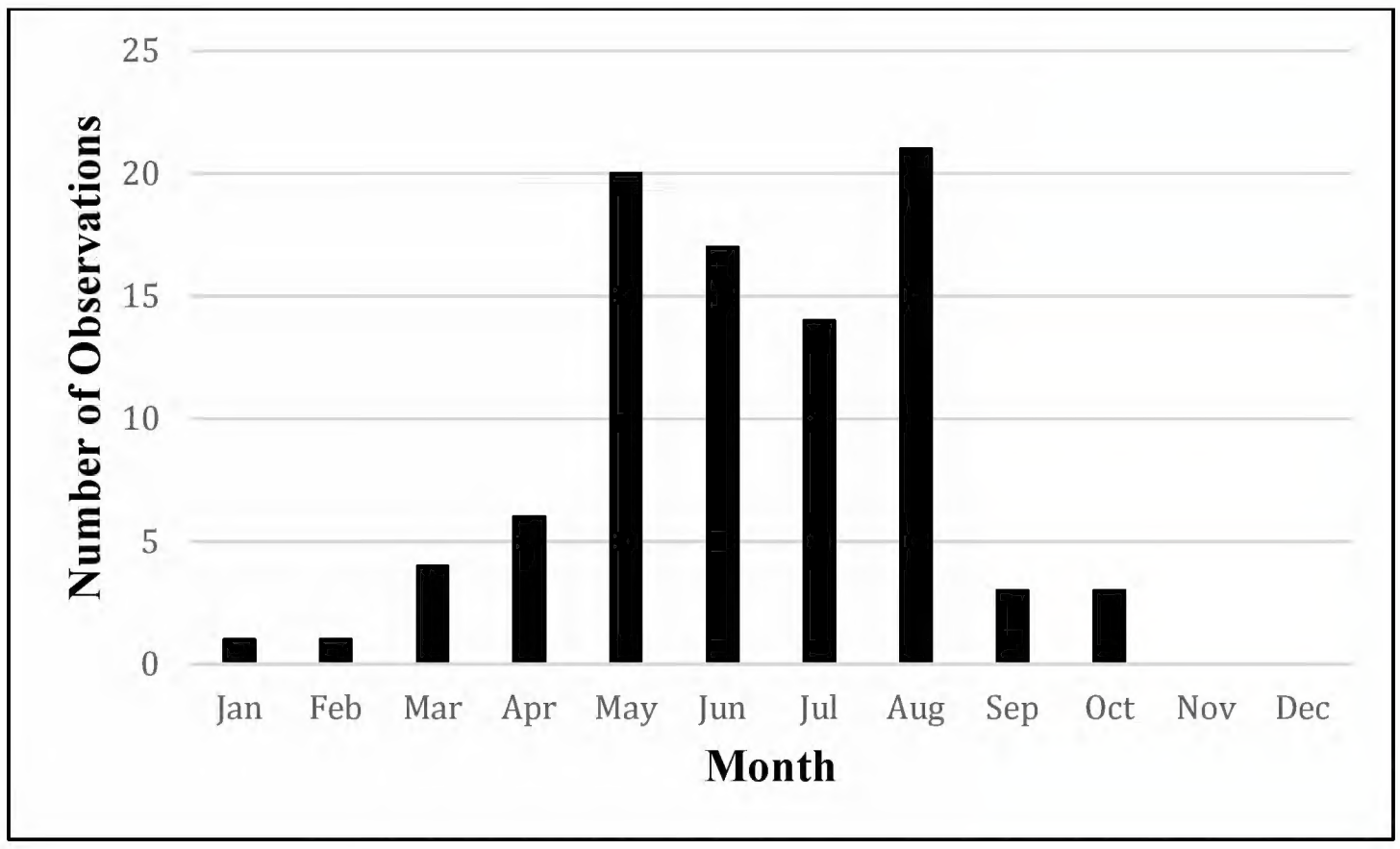

Figure 2. Reported spadefoot observations by month from VHS spadefoot reporting website from July 2019 through December 2022.

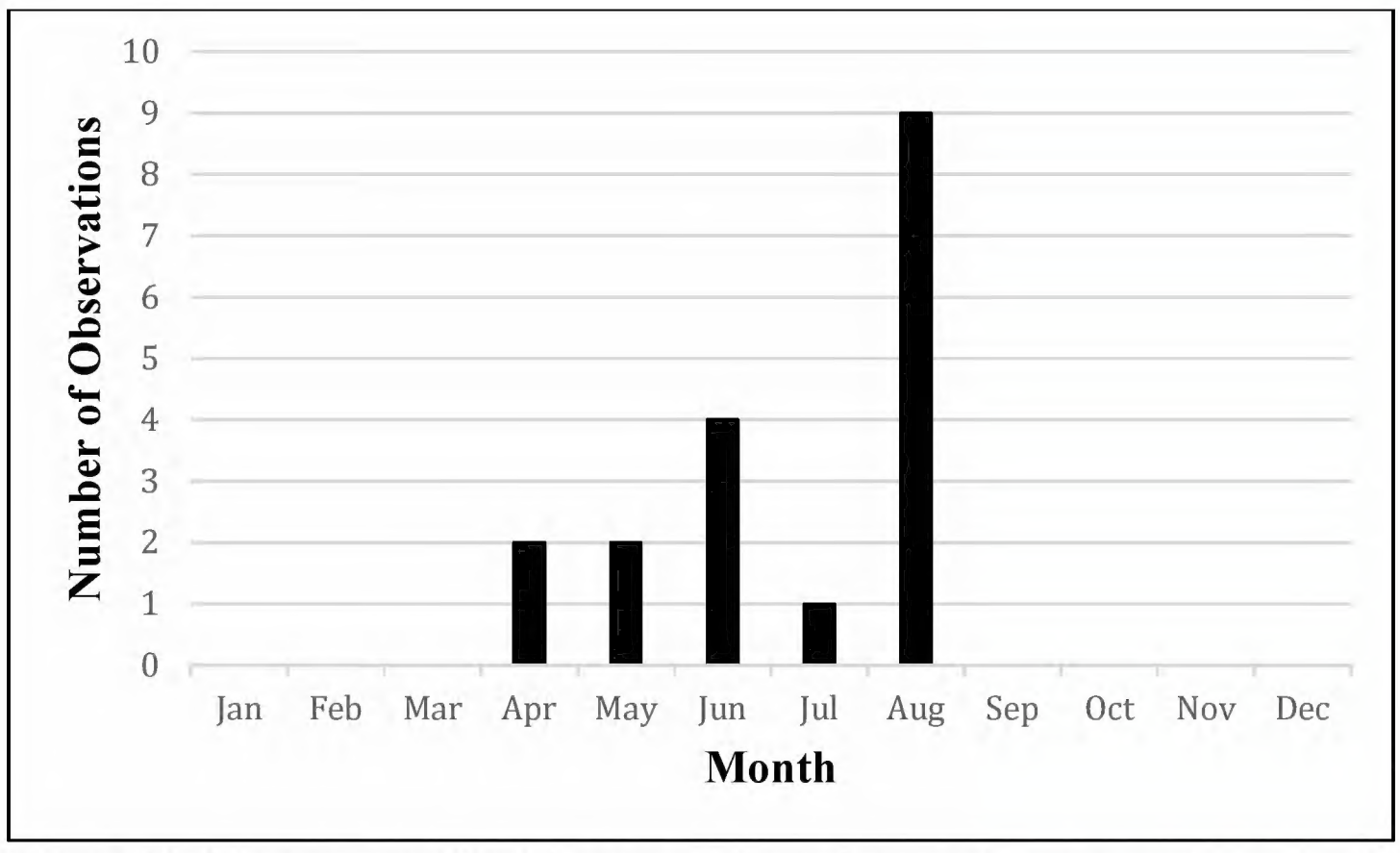

Figure 3. Frequency of calling spadefoots by month reported to the VHS spadefoot reporting website from July 2019 through December 2022.

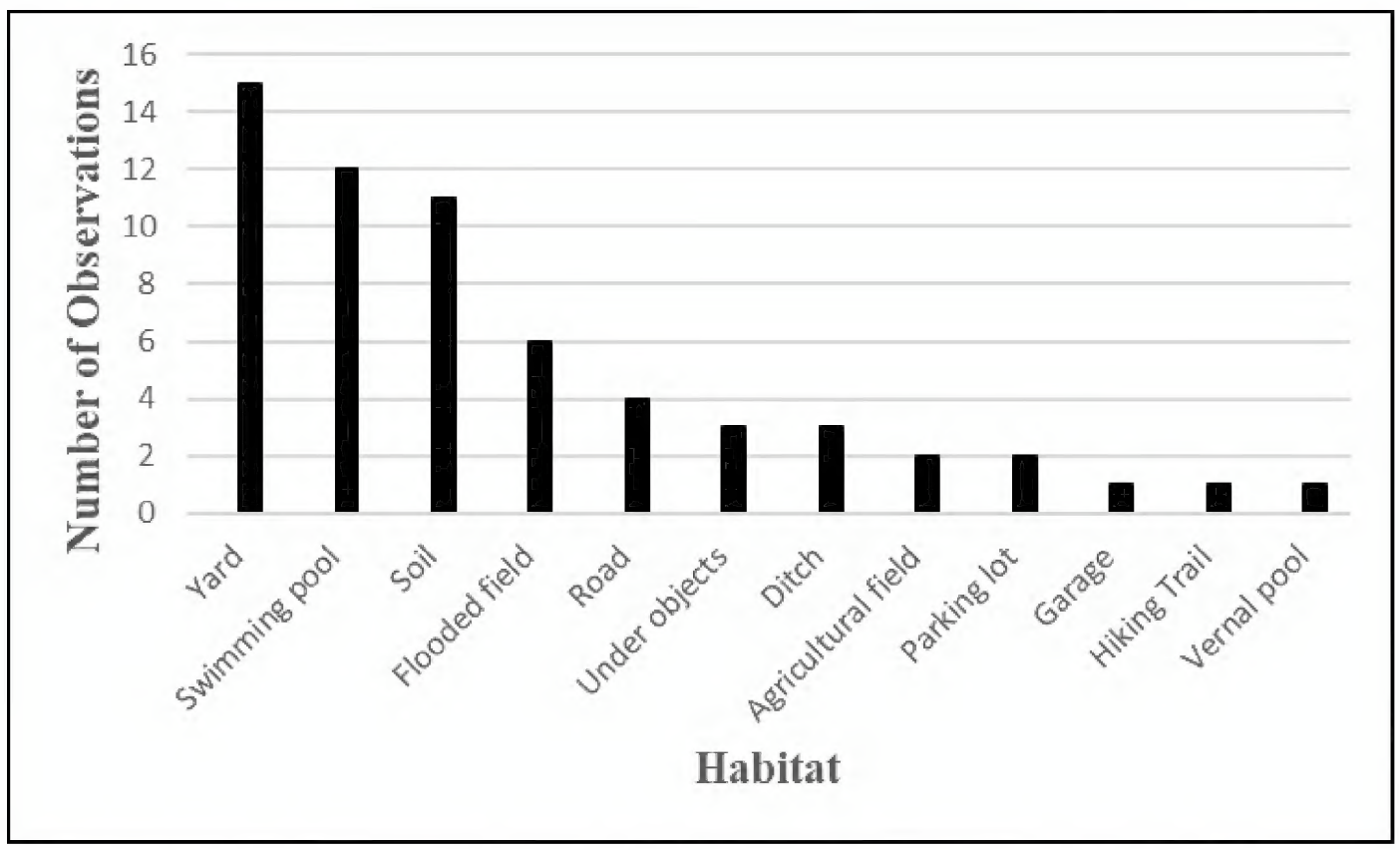

Figure 4. Frequency of spadefoot observations by reported habitat reported to the VHS spadefoot reporting website from July 2019 through December 2022.

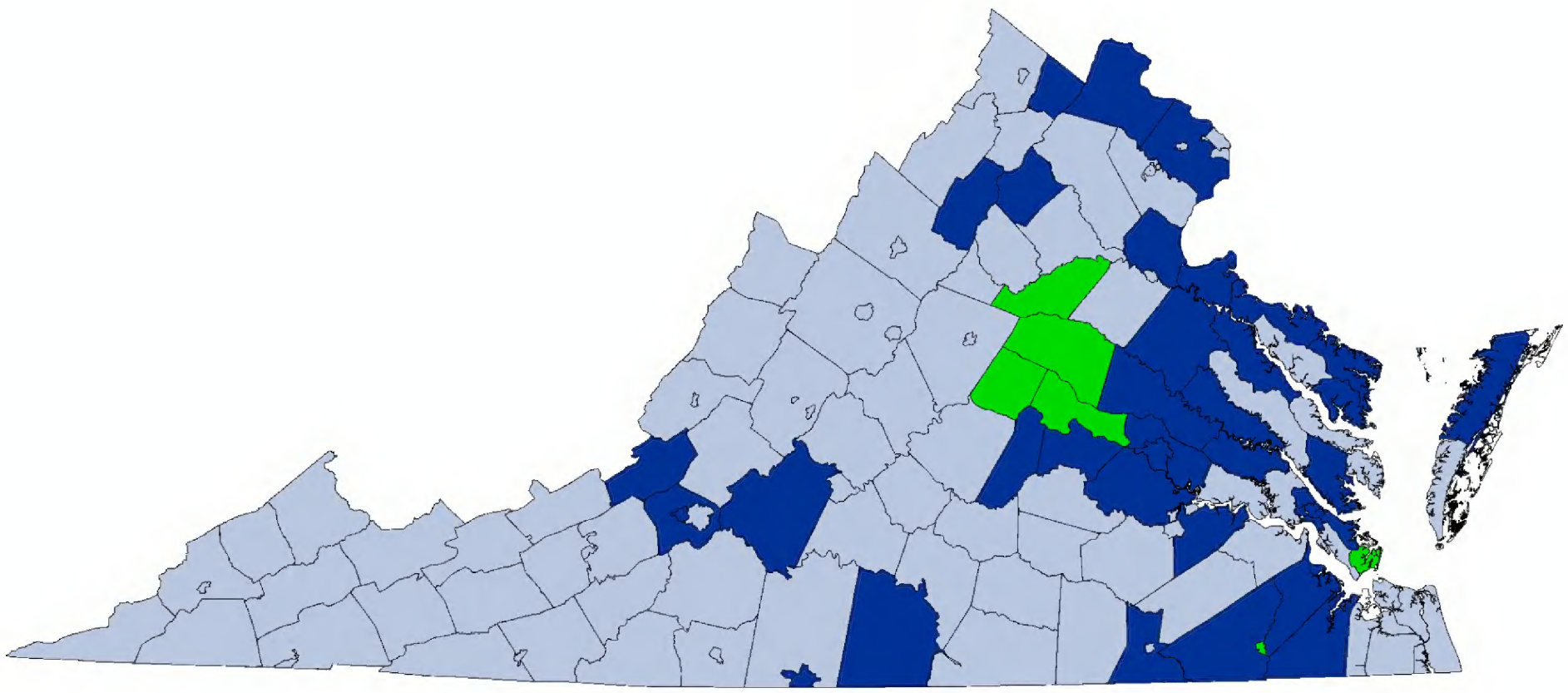

Figure 5. Map showing new county/city records (green) and county/city record confirmations (blue) reported to the VHS Eastern Spadefoot reporting site from July 2019 until December 2022.

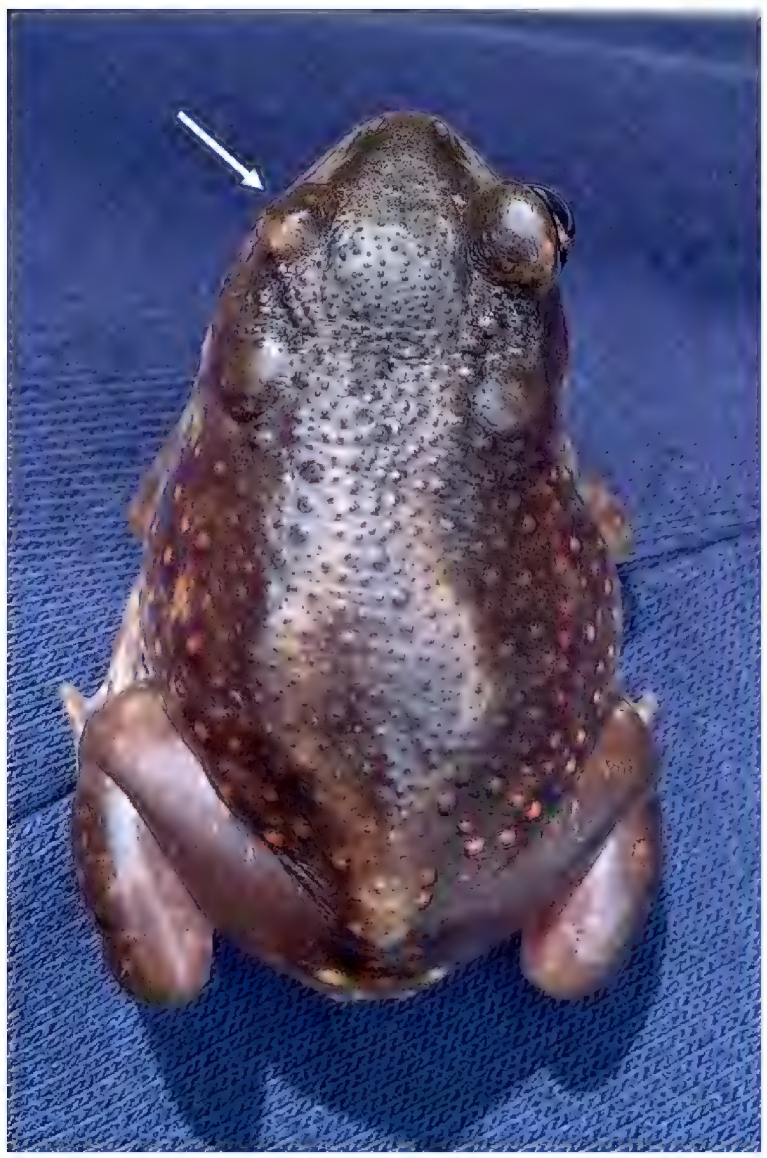

Figure 6. Eastern Spadefoot with eye anomaly (photograph taken by DeLainey Heyer).

iNaturalist Results

iNaturalist reported observations for spadefoots in all twelve months. The earliest observation was on 12 January 2018 (observation number 9455306 by user tjsonger16) and the latest was 30 December 2018 (observation number 19316291 by user kat36). Most spadefoots were reported to be seen in August; most observations were observed in May through August (Figure 7).

Observations came from 42 counties and 4 cities (Figure 8). Hanover County had the highest number of observations for counties with ten submitted observations and the city of Richmond had the highest number of observations for cities with seven submitted observations. Four new county records were recorded (Albemarle County (observation number 106471145 by user sharon152; Sharon Snyder) (VHS digital archive #705), Goochland County (observation number 13802683 by user aphaywood), Orange County (observation number 144619553 by user lucycolby1) (VHS digital archive #711), and Shenandoah County (observation number 80322819 by user wishalittle), additionally there were 38 county confirmations and 4 city confirmations. Spadefoot metamorphs coming out of breeding ponds were recorded on 10 June (Henrico County), 25 June (Goochland County), July 2 (Essex County), 16 and 23 August (Fairfax County). iNaturalist observers did not record much natural history information but some observers did report finding spadefoots in the following locations: edge of garage, basement of home, underground, in kitchen, under board, road killed, in swimming pool, buried in garden, inside a church, and in a dirt pile. Susan Watson, a past VHS president, was the first person to post an observation on Eastern Spadefoots in iNaturalist.

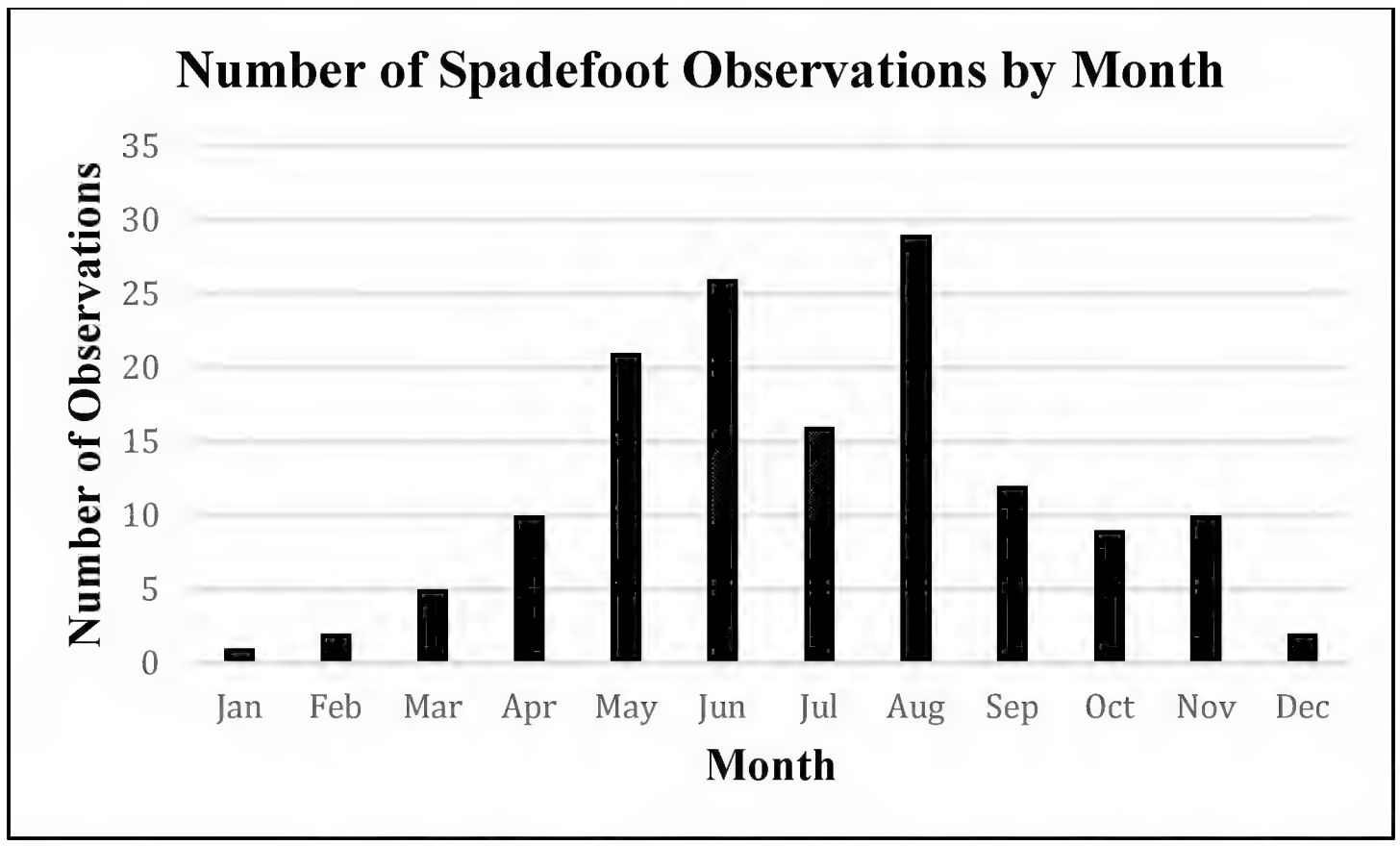

Figure 7. Reported spadefoot observations by month from iNaturalist website from June 2016 through November 14, 2022.

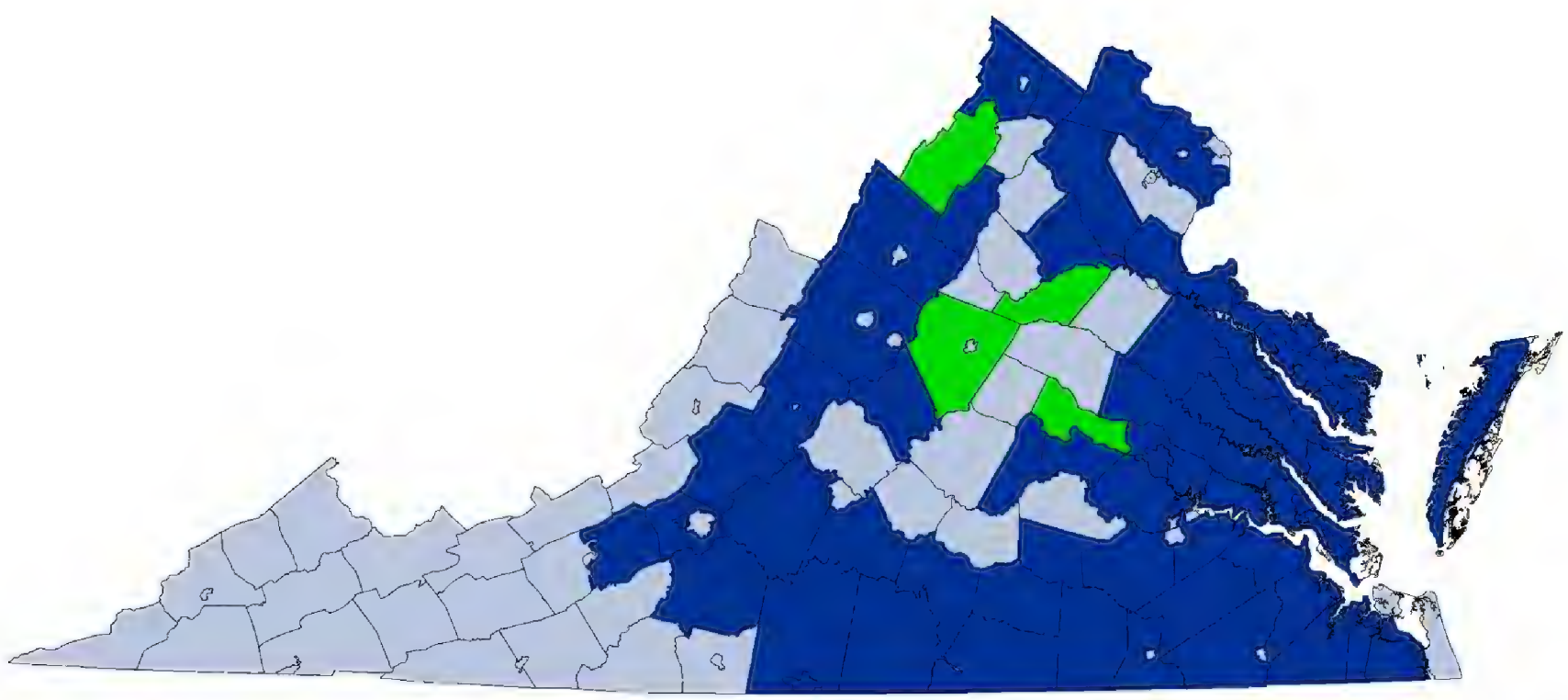

Figure 8. Map showing new county records (green) and county/city record confirmations (blue) reported to iNaturalist from June 2016 until 14 November 2022.

Review of the literature and other databases results

Since the publication of our original Eastern Spadefoot project in 2019 (Gibson and Anthony, 2019) no spadefoot county records have been reported in Herpetological Review, VertNet.org, or the Global Diversity Information Facility. HerpMapper only had four total observations for spadefoots in Virginia and none of these were county or city records. The VAFWIS database had new observations for spadefoots in the Cities of Buena Vista and Salem. Gibson and Partin (2020) reported in Catesbeiana finding

spadefoots in Stafford County. In our literature review and Google Scholar search we only found two articles published on Eastern Spadefoots in Virginia since 2019. In one article, Devan-Song et al. (2021) conducted a survey of spadefoots at Yorktown Battlefield in Colonial National Park in York County in 2016 and 2017. Using flashlights and exploiting spadefoot eyeshine, Devan-Song and her colleagues were able to find 1,959 Eastern Spadefoots in 21 survey nights. They concluded that spadefoots are not as secretive as once thought. A second article written by Devan-Song et al. (2022) using the same data collected in 2016-2017 including 1710 observations of subadults, breeding adults, and nonbreeding adults showed that breeding adult males and females were found to have greater affinity with breeding pool habitat (even dry pools) and subadults and non-breeding adults were found to be further from these breeding pools. They found that each life stage assorted in the environment such that juveniles and adults were less likely to occur with each other. They found the largest adult frogs were closer to the breeding pool with subadults and non-breeding adults being further away. Adult frogs were shown to utilize the habitat immediately around breeding pools with subadults and nonbreeding adults utilizing other surrounding wetland types adjacent to breeding pools.

DISCUSSION

In this paper, we have presented a summary of all the information that has been learned, posted, and published about Eastern Spadefoots in Virginia since 2019. Due to the efforts of hundreds of people from around the state, we have a better picture of where spadefoots live, when they are active, when the males call, and other natural history information. Figure 9 is the most recent map of Eastern Spadefoot distribution in Virginia. This species, which was once thought very hard to find is now observed quite frequently in most of Virginia. One piece of phenology that is still missing surrounds spadefoot eggs. We don't have good data on how many eggs each female lays, how many times a year a female can lay eggs, and dates when oviposition occurs. When viewing the updated Eastern Spadefoot distribution map a few mysteries remain. Why are there no records for this species to the west of Montgomery County and in the city of Virginia Beach. In the southwest, the reason may be due to fewer herpetological surveys and fewer observers in the field. We have no explanation as to why reports are absent from Virginia Beach. Although this species is not usually active during the day, listening for calling males or seeing them on the road on wet nights may yield results in all the areas without records, especially in seasonal wetlands near the floodplains of large rivers. Spotlighting at night and looking for eye shine in both wet and dry seasonal breeding pools and surrounding habitat may also be a productive method as shown by Devan-Song et al. (2021).

The popularity and ease of reporting observations on iNaturalist has contributed significantly to our understanding of when and where species can be found in Virginia. It is our hope that funding will not be cut from

supporting this site and the repository of information it holds. We believe there is still great importance in recording spadefoot observations in a print journal, which is the reason for the summary we published here. We encourage anyone making observations on Eastern Spadefoots to publish the observation in a print journal, such as Catesbeiana, where the information is not only stored digitally but also within libraries and museums.

To increase the quality of information gathered on the VHS Eastern Spadefoot reporting link we have begun to request observers look for and report seeing spadefoot eggs and upload breeding habitat descriptions. Additionally, we have started to encourage observers who have found eggs to monitor the pool and report the emergence of metamorphs. An advantage of the VHS Eastern Spadefoot reporting link over iNaturalist is our ability to gather more phenological data beyond just distribution and date of observation.

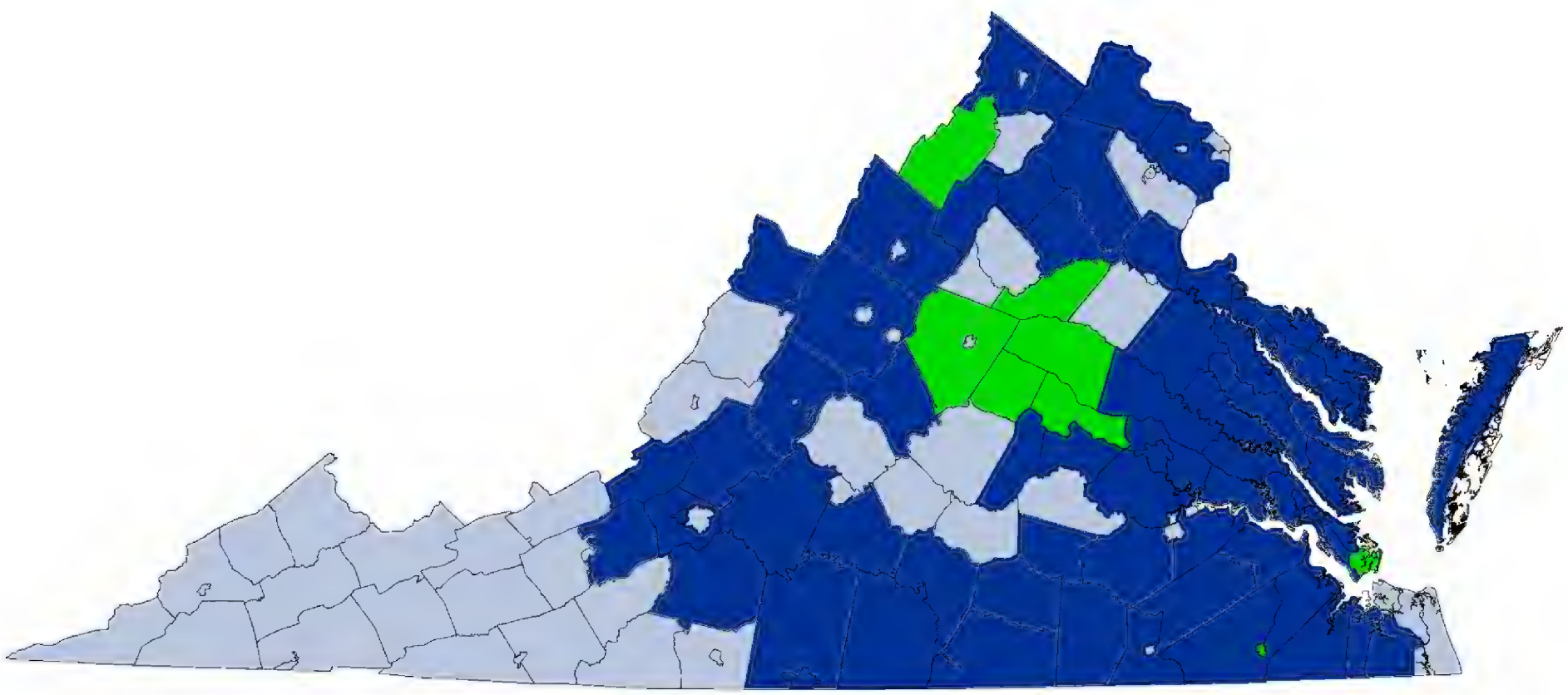

Figure 9. The most current county record map of Eastern Spadefoots in Virginia with green representing new county and city records contributed by the VHS reporting link and iNaturalist.

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ACKNOWLEDGEMENTS

We would like to thank all those who generously reported the numerous observations summarized in this paper. Without them this work would not be possible, and our understanding of the Eastern Spadefoot would be less complete. We would also like to thank John White for helping to create distribution maps. Lastly, we thank the two anonymous reviewers for making this a better paper

.

Table 1. List of observations by citizen scientists sent to the VHS spadefoot reporting website.

Name of the observer	County/City	Date of observation	County Record or Confirmation
Peggie Poluikis	Bedford County	6/18/2016	Confirmation
Chris Anderson	Page County	7/11/2016	Confirmation
Peggie Poluikis	Bedford County	8/17/2017	Confirmation
Glenn Glass	James City County	7/5/2019	Confirmation
Liam	Clarke County	9/16/2019	Confirmation
J.D. Kleopfer	Hanover County	2/6/2020	Confirmation
Cody LaBarge	City of Hampton	3/30/2020	City Record
Jessica Hale	City of Williamsburg	4/30/2020	Confirmation
Jen Riley	Clarke County	5/12/2020	Confirmation
Chelsea Merrick	Clarke County	5/12/2020	Confirmation

Corie Smith	King George County	5/12/2020	Confirmation
Breeanna Ebert	James City County	5/15/2020	Confirmation
Paula Valentine	Accomack County	5/18/2020	Confirmation
Kelly Clinevell	City of Salem	5/21/2020	Confirmation
Eric Newtson	City of Salem	5/22/2020	Confirmation
Alexandria Marquardt	Gloucester County	5/25/2020	Confirmation
DeLainey Heyer	Chesterfield County	5/30/2020	Confirmation
Joey Bane	Halifax County	6/17/2020	Confirmation
Erin Chapman	Cumberland County	6/19/2020	Confirmation
Patrycja Lawryniuk	York County	6/19/2020	Confirmation
Mary Steinbicker	Westmoreland County	7/2/2020	Confirmation
Catherine Unger	City of Richmond	7/9/2020	Confirmation
Joshua Ward	Craig County	7/11/2020	Confirmation
Connie Grimm	Gloucester County	7/28/2020	Confirmation
Heather Gillespie	Goochland County	8/4/2020	County Record
Jody Burton	Prince George County	8/4/2020	Confirmation
Kyle Smith	Hanover County	8/4/2020	Confirmation
Amanda Vtipilson	Prince George County	8/4/2020	Confirmation
Catherine Unger	City of Richmond	8/4/2020	Confirmation
Irvine Wilson	Henrico County	8/4/2020	Confirmation
Ty Smith	Greenville County	8/5/2020	Confirmation
Doug Morgan	Roanoke County	8/7/2020	Confirmation
Kelly Mihalcoe Madison	King William County	8/9/2020	Confirmation
Andy Brooks	Essex County	8/13/2020	Confirmation
Randy Streufert	Fairfax County	8/14/2020	Confirmation
Merri Collins	Fairfax County	8/15/2020	Confirmation
Benjamin J Pearson-Nelson	Chesterfield County	8/15/2020	Confirmation
Bob Baldwin	City of Richmond	8/15/2020	Confirmation
Sally Hurt	Chesterfield County	8/15/2020	Confirmation

Summary of Spadefoot Observations

Drew Reynolds	Northumberland County	8/16/2020	Confirmation
Bill Chapman	Lancaster County	8/16/2020	Confirmation
Kory Steele	Gloucester County	8/29/2020	Confirmation
No name given	Gloucester County	10/6/2020	Confirmation
Wendy Bryant Harrison	City of Franklin	1/5/2021	Confirmation
Nate Wiles	Isle of Wight County	3/19/2021	Confirmation
Phil Gervato	Southampton County	4/9/2021	Confirmation
Sherri Phillips	Gloucester County	4/10/2021	Confirmation
David Lundin	Gloucester County	4/17/2021	Confirmation
Steven Holland	City of Franklin	5/26/2021	Confirmation
Jessica Schrader	Gloucester County	6/3/2021	Confirmation
Amanda Traugh	Hanover County	6/11/2021	Confirmation
Rebecca Emmel	Louisa County	6/11/2021	County Record
Sherri Phillips	Gloucester County	6/12/2021	Confirmation
Joey Bane	Halifax County	6/23/2021	Confirmation
Frank Knott IV	Halifax County	6/29/2021	Confirmation
Sherri Phillips	Gloucester County	7/3/2021	Confirmation
Everett West	Chesterfield County	7/8/2021	Confirmation
Chii	James City County	7/12/2021	Confirmation
Jamey Kagey	Gloucester County	7/15/2021	Confirmation
Joesephin Ritenour	Stafford County	7/22/2021	Confirmation
Keith Darden	Hanover County	8/29/2021	Confirmation
Jen and Jackson Edwards	York County	10/26/2021	Confirmation
Lucy Colby	Orange County	3/7/2022	Confirmation
Jenny Erickson	Loudoun County	4/7/2022	Confirmation
Nancy Rusinak	Goochland County	6/21/2019	Confirmation
Sherri Phillips	Gloucester County	5/7/2022	Confirmation
Sheryl Lafferty	Accomack County	5/13/2022	Confirmation
Joey Bane	Halifax County	5/13/2022	Confirmation

Sherri Phillips	Gloucester County	5/20/2022	Confirmation
Dylan Bryant	York County	5/22/2022	Confirmation
David A Traud	Orange County	5/18/2022	Confirmation
William J Oplinger	King George County	5/25/2022	Confirmation
Ryan Niccoli	Chesterfield County	5/30/2022	Confirmation
Ryan Niccoli	Chesterfield County	5/19/2022	Confirmation
Rachel Kelmartin	Fairfax County	6/2/2022	Confirmation
Gabriel Glover	City of Richmond	5/6/2022	Confirmation
Tristan Crawford	Powhatan County	6/9/2022	Confirmation
Lori Dameron	Rappahannock County	6/23/2022	Confirmation
Melanie Roy	New Kent County	6/8/2022	Confirmation
Jeweliette Coyle	City of Danville	7/7/2022	Confirmation
Kory Angstadt	Gloucester County	6/20/2022	Confirmation
James Niccoli	Chesterfield County	7/26/2022	Confirmation
Tyler price	Page County	6/17/2021	Confirmation
Sabbakhan Rama	Hanover County	7/28/2022	Confirmation
Kevin J Mahaffy	York County	3/25/2022	Confirmation
Melissa Gross	Westmoreland County	8/11/2021	Confirmation
Benjamin Schweinhart	Caroline County	9/3/2022	Confirmation
Kathryn Ricotta	Fluvanna County	9/17/2022	Confirmation
Brittney Scheffler	City of Suffolk	10/18/2022	Confirmation

2022 Lake Anna Survey
Lake Anna State Park
Spotsylvania County, Virginia

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Abstract: Lake Anna State Park is a 1,265.5 hectare park in Spotsylvania County with wetlands, woodland habitats, edge habitats, and open fields. The survey occurred on two dates, 14 May 2022 and 19 June 2022 and was conducted by 45 volunteers. There were 107 individuals of 27 species of herpetofauna recorded (14 amphibians and 13 reptiles). Of the 27 species documented, one was a Virginia Department of Wildlife Resources Tier IVb species (Snapping Turtle). Future small-scale, long-term surveys of the park could uncover additional records for Spotsylvania County.

Key words: Herpetological Survey, Lake Anna State Park, Spotsylvania County, VDWR Tier IVb, Snapping Turtle

INTRODUCTION

Lake Anna State Park is a 1,265.5 hectare (3,127 acre) park located in the Piedmont Province of Virginia (Tobey, 1985) with a plethora of habitats: creeks, ponds, lakes, open fields, forests, and edge habitats. In the early 1800's - 1900's the area which would become Lake Anna State Park was used for mining gold (Maurer, 2019). Lake Anna was created in 1971 to cool the nearby power plant (Maurer, 2019) and was opened as a park in 1983 (Adkins, 2012).

The 2022 Lake Anna Survey was held at Lake Anna State Park in Spotsylvania, Virginia. This was the second time the Virginia Herpetological Society (VHS) conducted a survey in this park. In 2018 the VHS conducted the Annual Spring Survey here. At the time there were only 37 species of herpetofauna that had been documented in Spotsylvania County (VHS database, 2019). During the pre-survey and survey an additional 10 county records were made (Neff, 2019). An additional three species have been documented since. Lake Anna

State Park was selected for a second survey because it is a large park with many different habitats that could potentially hold many previously undocumented species.

SURVEY SITES

The study sites for the 2022 Lake Anna Survey at Lake Anna State Park are listed below and can be seen in Figure 1.

Site 1 – Railroad Ford Trail (38°06'44.7"N, 77°49'49.0"W) This site followed the Railroad Ford Trail which began at the end of the Old Pond Trail and included streams, seeps, and woodland habitat.

Site 2 – Fisherman's Trail (38° 7' 4.8"N, 77° 50' 14.5"W) This site followed Fisherman's Trail which started at the picnic area and followed the social trail adjacent to Lake Anna. The trail eventually headed off to higher ground away from the water and included mostly woodland habitat.

Site 3 – Mill Pond Trail (38° 6' 59.8"N, 77° 49' 8.0"W) Site 3 began at the Trailhead of Mill Pond Trail (across the street from the Sawtooth Trailhead) and headed north towards Pigeon Run Trail. The habitat was woodland mixed with some wetland.

Site 4 – Old Pond Trail and Beach (38°06'43.1"N, 77°49'54.0"W) This site followed Old Pond Trail and looped around to the beach. This was primarily the water edge habitat of Old Pond as well as flooded areas on the beach of Lake Anna.

Site 5 - Unmarked Waterfront Trail (38°06'44.7"N, 77°49'49.0"W) This site followed along the Railroad Ford trail and ventured off on an unmarked trail that was along the water's edge which included streams, vernal pools, and woodland habitat

Site 6 – Glenora Trail (38°06'36.1"N, 77°49'33.8"W) This site started at the Glenora Trail trailhead, near the campsites, and headed southeast along the trail towards the Big Woods Trail. The habitat at this site was primarily woodland with many streams.

Site 7 – Power lines and adjacent forest (38°08'22.3"N, 77°48'55.3"W) This survey area began at the parking area through the main entrance gate and continued southeast along the power lines and back up into the wooded area near the main park road. The habitat was primarily edge habitat and woodland habitat.

Figure 1. Map showing Lake Anna State Park and survey sites at the park.

METHODS AND MATERIALS

For the surveys on Saturday, 14 May and Sunday, 19 June 2022 participants were split into 7 groups. Prior to surveying, participants were informed about proper handling, surveying, and disinfection techniques. Methods used to find animals included: capturing by hand or net, visual observation, listening for calling anurans, and flipping cover objects (rocks, logs, and boards). Group leaders filled out standardized survey data sheets to record all animals encountered. Data sheets included information on: the physical environment, weather, animal health, and microhabitat. Other data collected included: photographs of rare species, presence of disease or injury, age, and sex.

RESULTS

On Saturday, 14 May the temperature was 21°C with an overcast sky and brief drizzle. On Sunday, 19 June the temperature was 19.4°C to 24.4°C and weather conditions were breezy with sunny skies. There were a total of 183 person hours per survey effort between all of the survey dates - 77.5 person hours during the first survey date Saturday, May 14 (Table 1), and 105.5 person hours on Sunday, June 19 (Table 2).

Table 1. Summary of survey effort per site on Saturday, 14 May 2022.

Survey Site	No. of Surveyors	Hours	Estimated Hours	Pe
1	10	3.5	35	
2	5	3.5	17.5	
3	6	3.5	21	
4	4	1	4	
Sub-Total			77.5	

Table 2. Summary of survey effort per site on Saturday, 19 June 2022.

Survey Site	No. of Surveyors	Hours	Estimated Hours	Pe
5	11	4.5	49.5	
6	8	4	32	
7	6	4	24	
Sub-Total			105.5	

There were 107 individual animals of 27 species of herpetofauna recorded - 14 amphibians (Table 3) and 13 reptiles (Table 4).

Table 3. Summary of the number of amphibians observed at each site.

Sites	1	2	3	4	5	6	7	
Species								Total
Acris crepitans	1	1	2		1	5		10
Ambystoma maculatum					1			1
Ambystoma opacum					19		1	20
Anaxyrus a. americanus				2	2			4
Anaxyrus fowleri				3			1	4
Eurycea cirrigera						2		2
Hemidactylium scutatum					1			1
Hyla versicolor			1					1
Lithobates clamitans					6	14	1	21
Lithobates palustris					1		1	2

Notophthalmus v. viridescens		1						1
Plethodon cinereus	1		1		1			3
Plethodon cylindraceus			1			1		2
Pseudotriton r. ruber			1					1
Total	2	2	6	5	32	22	4	73

Table 4. Summary of the number of reptiles observed at each site

Sites	1	2	3	4	5	6	7	
Species								Total
Carphophis a. amoenus	1		1		3			5
Chelydra serpentina					1			1
Chrysemys p. picta					4			4
Coluber c. constrictor			1				1	2
Nerodia s. sipedon	3			1				4
Pantherophis alleghaniensis			1					1
Plestiodon fasciatus							1	1
Plestiodon laticeps		1						1
Plestiodon sp.	1				2	4		7
Sceloporus undulatus			1		1	2	1	5
Storeria dekayi							1	1
Sternotherus odoratus					1			1
Virginia v. valeriae					1			1
Total	5	1	4	1	13	6	4	34

ANNOTATED CHECKLIST

Note: for the accounts below numbers in parentheses are animals accounted for at each site listed

Amphibians

1. *Acris crepitans* (Eastern Cricket Frog) – A total of 10 *A. crepitans* were found across five sites: 1, 2, 3, 5, and 6. All were found moving around on the forest floor. At site 5, a chorus of *A. crepitans* were heard calling near a vernal pool.

2. *Ambystoma maculatum* (Spotted Salamander) – A single *A. maculatum* was found at site 5 under a log.

3. *Ambystoma opacum* (Marbled Salamander) – Twenty *A. opacum* were found at sites 5 (19) and 7 (1). All were found under cover objects. A majority of the *A. opacum* found at site 5 were recently metamorphosed individuals.

4. *Anaxyrus americanus americanus* (Eastern American Toad) – Four *A. a. americanus* were found at sites 4 (2) and 5 (2). The *A. a. americanus* seen at site 4 were males that were calling by Lake Anna. The *A. a. americanus* at site 5 were found under cover objects.

5. *Anaxyrus fowleri* (Fowler's Toad) – Four *A. fowleri* were found at sites 4 (3) and 7 (1). The *A. fowleri* at site 4 were males that were calling by Lake Anna and the individual found at site 7 was near the side of the road.

6. *Eurycea cirrigera* (Southern Two-lined Salamander) – Two *E. cirrigera* were encountered at site 6 under leaves at the bottom of a creek.

7. *Hemidactylium scutatum* (Four-toed Salamander) – A single adult *H. scutatum* was found at site 5 under a log surrounded by *Lycopodium digitatum* (Fan Clubmoss).

8. *Hyla versicolor* (Gray Treefrog) – One *H. versicolor* was found at site 3 which was next to a log in a puddle.

9. *Lithobates clamitans* (Green Frog) – Twenty-one *L. clamitans* were found at sites 5 (6), 6 (14), and 7 (1). Individuals were heard calling at sites 5 and 6. Sites 5 and 7 had adult *L. clamitans* found at the edge of a pond or creek. Site 7 had 12 *L. clamitans* tadpoles in a creek.

10. *Lithobates palustris* (Pickerel Frog) –Two *L. palustris* were found at sites 5 and 7 at the edge of a pond or creek.

11. *Notophthalmus viridescens viridescens* (Red-spotted Newt) – A single *N. v. viridescens* was found at site 2. Its microhabitat or behavior was not noted.

12. *Plethodon cinereus* (Eastern Red-backed Salamander) – *Plethodon cinereus* were found at sites 1 (1), 3 (1), and 5 (1). All were found under logs.

13. *Plethodon cylindraceus* (White-spotted Slimy Salamander) – Two *P. cylindraceus* were found at sites 3 (1) and 6 (1). Both individuals were found under cover objects. The *P. cylindraceus* found at site 3 was a juvenile and the individual found at site 6 was an adult.

14. *Pseudotriton ruber ruber* (Northern Red Salamander) – One *P. r. ruber* was found at site 3 under a log.

Reptiles

15. *Carphophis a. amoenus* (Eastern Wormsnake) – Five *C. a. amoenus* were found across sites 1 (1), 3 (1), and 5 (3). All were found under cover objects such as logs and tree bark.

16. *Chelydra serpentina* (Snapping Turtle) – One *C. cerpentina* was found at site 5 swimming in Old Pond.

17. *Chrysemys picta picta* (Eastern Painted Turtle) – Four *C. p. picta* were found at site 5 basking on a log.

18. *Coluber constrictor constrictor* (Northern Black Racer) – *Coluber c. constrictor* was found at sites 3 (1) and 7 (1). The individual found at site 7 was periscoping in the ferns in the sun and the one found at site 3 was shed skin found on the forest floor.

19. *Nerodia sipedon sipedon* (Northern Watersnake) – Four *N. s. sipedon* were found at sites 1 (3) and 4. All were found on the land area next to Old Pond or Lake Anna.

20. *Pantherophis alleghaniensis* (Eastern Ratsnake) – A single adult *P. alleghaniensis* was found at site 3 on the forest floor.

21. *Plestiodon fasciatus* (Common Five-lined Skink) - One *P. fasciatus* was found at site 7 under concrete blocks.

22. *Plestiodon laticeps* (Broad-headed Skink) - A single *P. laticeps* was found at site 2. Its microhabitat or behavior was not noted.

23. *Plestiodon sp.* (Toothed skink species) – Seven unidentified *Plestiodon sp.* were found at sites 1 (1), 5 (2), and 6 (4). All the unidentified skinks that were found were basking, except one of them at site 6 was found under tree bark.

24. *Sceloporus undulatus* (Eastern Fence Lizard) - Five *S. undulatus* were found across four sites: 3 (1), 5 (1), 6 (2), and 7 (1). All *S. undulatus* encountered were on top of logs, rocks, or on the side of a tree.

25. *Storeria dekayi* (Dekay's Brownsnake) – A single *S. dekayi* was found at site 7 dead on the road.

26. *Sternotherus odoratus* (Easter Musk Turtle) – One *S. odoratus* was found at site 5 at Old Pond.

27. *Virginia valeriae valeriae* (Eastern Smooth Earthsnake) – A single *V. v. valeriae* was found at site 5 under a log that was next to the *C. amoenus* found at site 5.

DISCUSSION

Lake Anna State Park was selected to conduct another survey due to the lower number of species documented in Spotsylvania County when compared to neighboring counties (VHS database, 2022). This is supported by the counties adjacent to Spotsylvania having higher numbers of documented herpetofauna and not having substantially different habitat or continuous forest cover. Also, Lake Anna State Park has a variety of optimal habitats located within the park that could support these remaining species (Neff, 2019). Combining numbers from the 2018 and 2022 surveys, 552 individual animals of 40 different species were found (18 amphibians and 22 reptiles). All of the herpetofaunal species in 2022 were found in the 2018 survey except for: *Storeria dekayi*, *Sternotherus odoratus*, and *Virginia v. valeriae*. None of the animals found in the 2022 survey were new records for Spotsylvania County.

At the end of the Annual Spring Survey in 2018, there were 10 new county records recorded. It was estimated that 17 additional species could be found when totaling documented herpetofauna from neighboring

counties (Neff, 2019). In the four years since the 2018 Spring Survey, there have been three additional species of herpetofauna documented in Spotsylvania County. In 2020 *Opheodrys a. aestivus* (Northern Rough Greensnake) had been documented deceased on the sidewalk at Patriot Park (Manley, 2020), 25 km to the northeast of Lake Anna State Park. In 2022 both *Regina septemvittata* (Queensnake) and *Clemmys guttata* (Spotted Turtle) had been documented in Spotsylvania County. The single *R. septemvittata* had been documented slithering across a patio at a private residence just off of Lake Anna (Dunning, 2022). This individual was found 9 km west of Lake Anna State Park. A single *Clemmys guttata* was documented in a shallow puddle within a forested habitat with several creeks nearby (Lyon and Fuchs, 2022).

When adding up the total number of herpetofauna from counties surrounding Spotsylvania, but have not been documented yet, there are fourteen species that are thought to be found within the boundaries of the park (VHS database, 2022). Three of those species are anurans: *Gastrophryne carolinensis* (Eastern Narrow-mouthed Toad), *L. catesbeianus* (American Bullfrog), and *L. sphenocephalus* (Coastal Plains Leopard Frog). Three of the species are salamanders: *Siren lacertina* (Greater Siren), *S. intermedia intermedia* (Eastern Lesser Siren), and *P. montanus montanus* (Eastern Mud Salamander). Five more species of snake are thought to be found: *Cemophora coccinea copei* (Northern Scarletsnake), *Farancia erytrogramma erytrogramma* (Common Rainbowsnake), *Heterodon platirhinos* (Eastern Hog-Nosed Snake), *Lampropeltis triangulum* (Eastern Milksnake), and *Pantherophis guttatus* (Red Cornsnake). One species of lizard is outstanding in Spotsylvania County, *Aspidoscelis sexlineata* (Eastern Six-lined Racerunner). There are also two turtle species still thought to be found at the park: *Kinosternon subrubrum* (Eastern Mud Turtle) and *Pseudemys concinna concinna* (Eastern Red-bellied Turtle).

In order to document additional species, it is suggested that park staff conduct smaller scale, long-term surveys. Setting coverboards in edge or woodland habitats could attract the different snake species listed above. Baited turtle traps and hoops could attract *K. subrubrum*. Smaller, baited minnow traps could attract the aquatic salamanders: *S. lacertina* and *S. i. intermedia*. Auditory surveys through citizen science programs like FrogWatch USA could uncover the three remaining frog species.

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Geographic, seasonal, habitat and climate factors impacting prevalence of anuran species during Virginia Herpetological Society surveys between 1991-2022

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Abstract: A review of 60 Virginia Herpetological Society biodiversity surveys conducted between 1991 and 2022 found that geographic, seasonal, habitat, and climate factors are impacting the prevalence of anurans found during surveys. Of 28 anuran species inhabiting Virginia, 25 were documented in surveys with three, *Anaxyrus quercicus*, *Hyla gratiosa*, and *Pseudacris nigrita* not being found at any survey, even when surveys occurred in locations within these species' ranges. *Lithobates clamitans* was the most commonly found frog, at 54 of 60 surveys (it was found in 90% of surveys occurring in its known range). Eighteen species of anurans were found in 50% or less of the surveys conducted in their known ranges. As a group, chorus frogs (genus *Pseudacris*), excluding *Pseudacris crucifer*, were among the least reported anurans during surveys, even when surveys were conducted within their known ranges. Surveys were conducted from March until September, with the majority occurring in May (46%). By conducting a pre-site survey in March and a post-site survey in June, many more species of anurans could be included in the final species tally for a given location.

Keywords: Herpetological diversity survey, frogs, toads, Virginia Herpetological Society

INTRODUCTION

Since 1991 the Virginia Herpetological Society has conducted at least one herpetological diversity survey each year. These surveys occur during different time periods, but usually in May or June, and take place in different locations around the state of Virginia. The purpose of these surveys is to give VHS members a chance to meet with other members, to provide field experience, and to document the diversity of amphibians and reptiles at various locations around Virginia. A typical survey consists of dividing the survey property into multiple survey sites, equally dividing participants into groups, and then having each group survey a specific site for a designated period. Survey methods include hand capture, dipnetting, road cruising, listening for calling anurans, flipping, and replacing cover objects, and visual encounters. For each survey site group leaders are responsible for documenting the following information on data sheets: species found, the number of animals observed, age class of every animal, the health of each animal captured, and any signs of disease or damage to each animal. Additionally, egg counts, observations on calling male anurans, and microhabitat descriptions are often recorded. The number of person hours of effort at each survey site is also documented on data sheets. These data sheets are collected, summarized, and then stored in the VHS physical archive. Digital recordings of calling anurans and digital photographs are also collected and stored in the VHS digital archives. Summaries of these observations are published in the Journal of the Virginia Herpetological Society; Catesbeiana. It is hoped that this information helps to document the herp diversity of an area and that this information could be used by land managers and future researchers to better understand the natural history and distribution of these animals. In years to come the VHS plans to revisit

previously surveyed sites and analyze differences between earlier survey results.

At the time of writing, the VHS has conducted and published 60 surveys. The first VHS Herp Survey recorded in Catesbeiana was on April 27-28, 1991, at Chippokes State Park in Surry County, and the last published was in Accomack County at Doe Creek Wildlife Management Area in March and June of 2022. The aim of this paper is to analyze the contributions these surveys are making to our knowledge of anurans in Virginia, to determine what factors are impacting the species being found during surveys, and to provide suggestions for ways the VHS could improve the survey process to better record the diversity of anurans that live in Virginia.

MATERIAL AND METHODS

Starting with the first VHS survey reported in Catesbeiana to the most recently published as of 2022, I read each survey report and recorded in a data table the following information for each published account: which species of anurans were found, which physiographic province was surveyed, in which month the survey was conducted, in which county(ies) or city(ies) the survey was conducted, and the journal volume and number. This information was collated and placed in four data tables (Tables 1-4). Each data table was arranged to show with an asterisk whether an anuran species was present for each survey. The abbreviations used in the data table for physiographic provinces are (C = coastal plain, P = piedmont, B = blue ridge, R = ridge and valley, A = Appalachian plateau) and for the month (Ma = March, A = April, M = May, J = June, Ju = July, Au = August, and S = September). The county or city for each survey was documented in the table using Federal Information Processing Standard (FIBS) codes. Each published survey was referenced using a three-digit code that corresponds to the volume and number of Catesbeiana (ex. Volume 38 number one = 381). A map showing the locations of all surveys was created (Figure 1). A bar graph showing the percentage of the surveys conducted in different physiographic provinces compared to the percentage of land area for each physiographic province was created using Microsoft Excel (Figure 2). Another bar graph showing the number of surveys per month was also created using Microsoft Excel (Figure 3). After consulting herpetological atlases and the Virginia Herpetological Society's anuran distribution maps a data table was created showing the number of VHS surveys in each species' known range, the percent of surveys where each species was found in its known range, and the percent of surveys where each species was not documented in its known range (Table 5). Using herp atlases, Virginia Fish and Wildlife Information Service (VaFWIS), the Virginia Herpetological Society anuran database, and unpublished observations a county distribution map showing the total number of anurans per county was created (Figure 4).

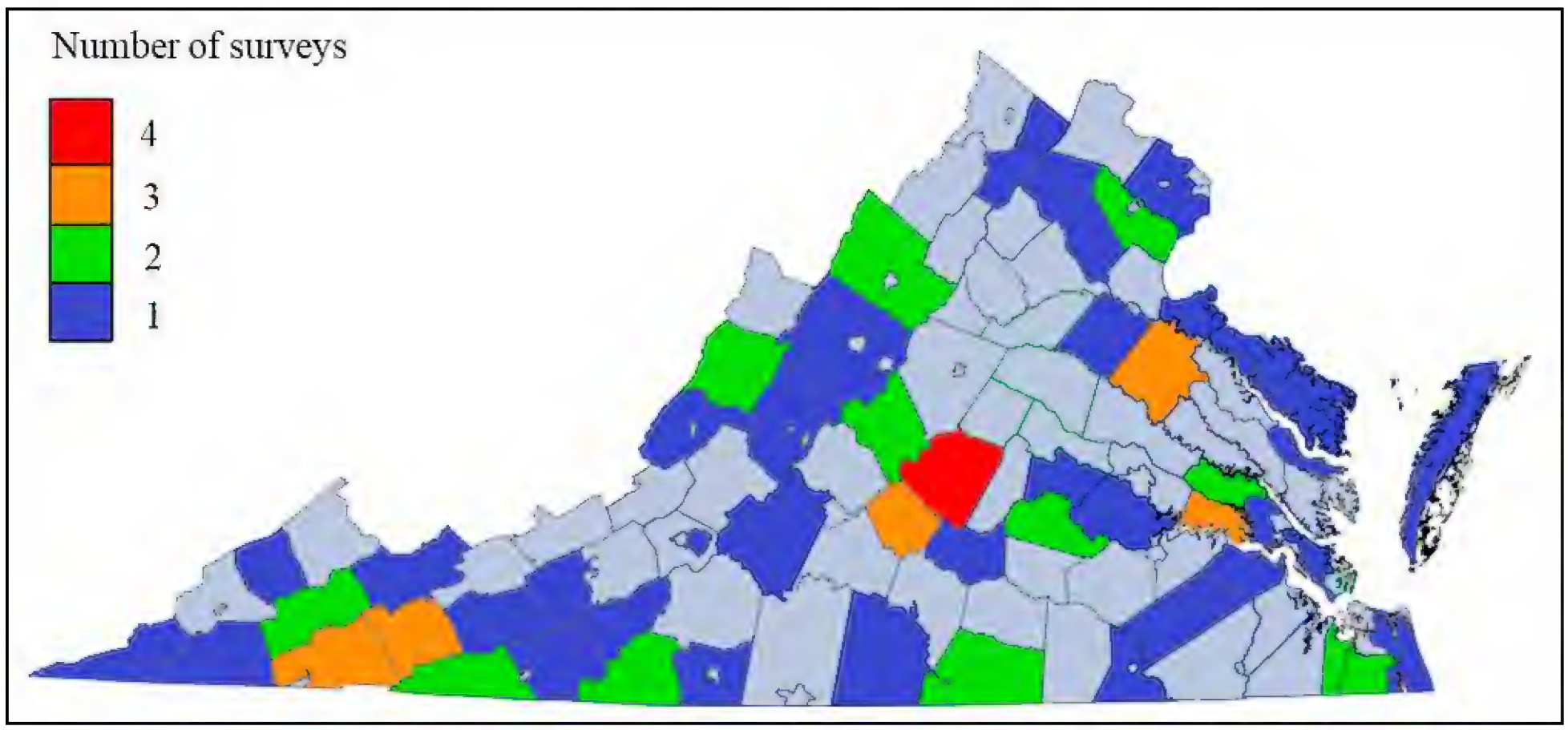

Figure 1. County map of Virginia showing where each of the 60 VHS surveys occurred. Gray represents no surveys in that county/city.

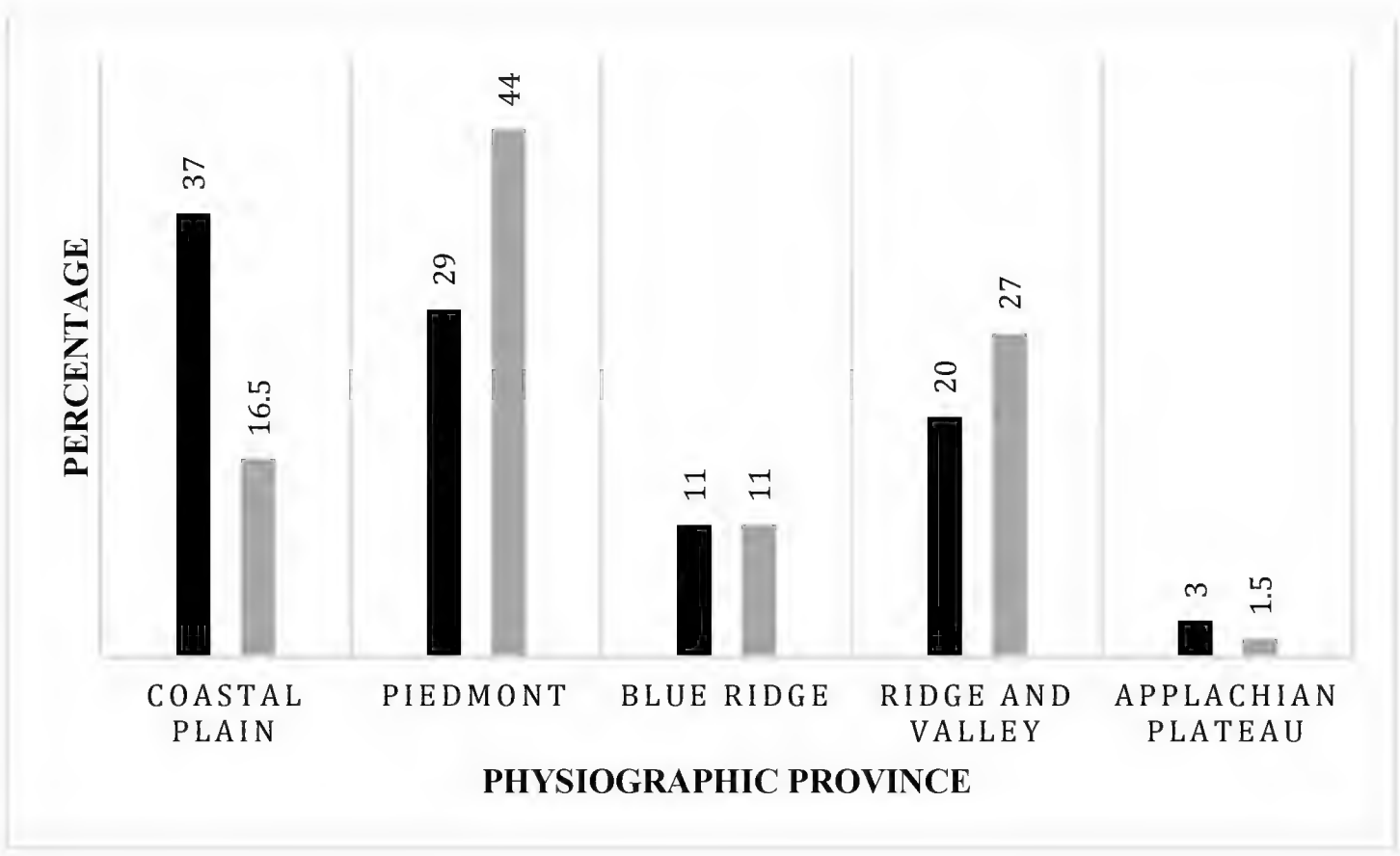

Figure 2. The frequency of surveys by physiographic province. Black represents the percentage of surveys conducted in each physiographic province. Gray represents the estimated percentage of Virginia found in each physiographic province.

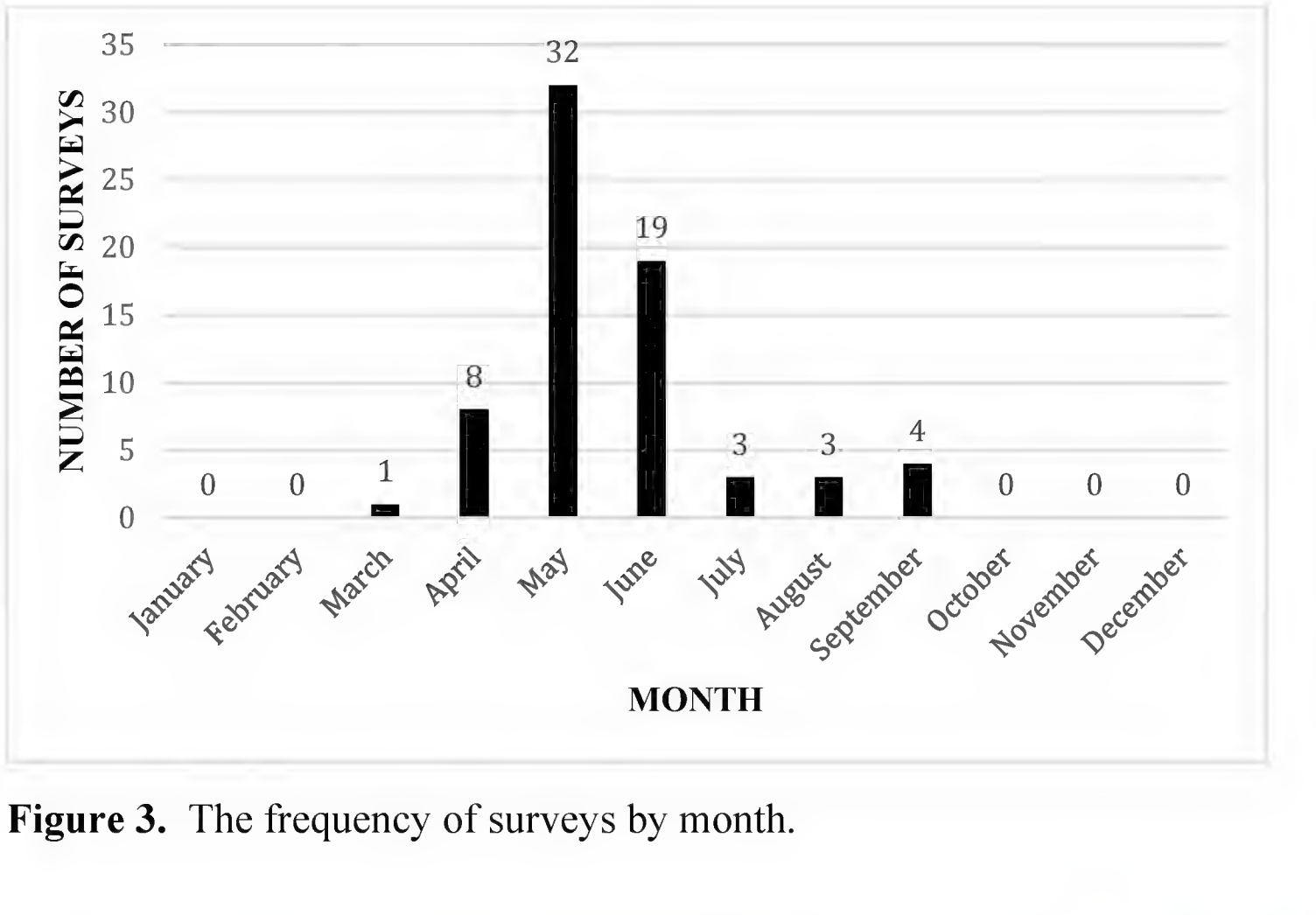

Figure 3. The frequency of surveys by month.

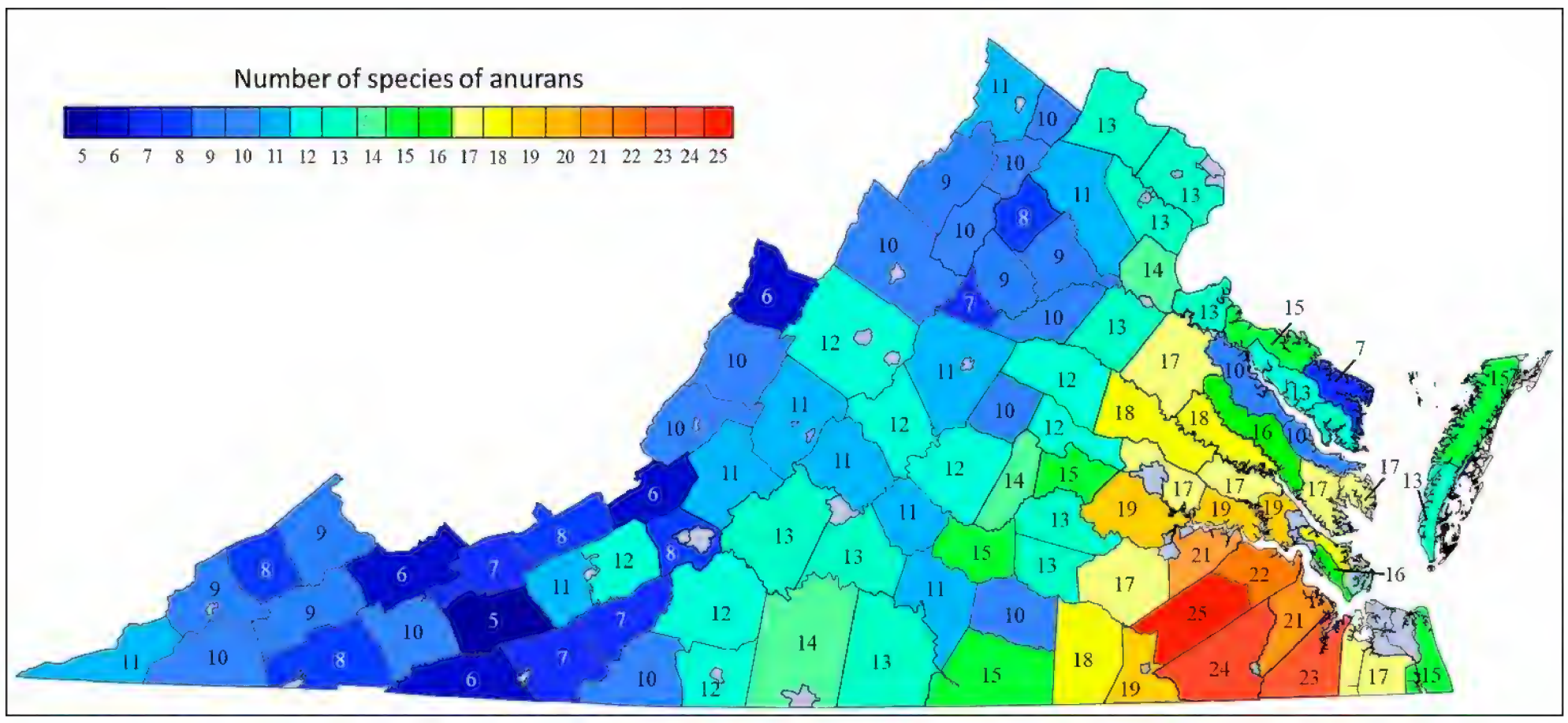

Figure 4. Map showing the number of species of anurans documented for each county.

RESULTS

The 60 surveys conducted by the VHS between 1991 and 2022 found 25 of 28 anuran species known to occur in Virginia (Tables 1-4). The lowest number of anuran species found during a survey was zero (Mole Hill, Rockingham County) and the highest number of anuran species found during a survey was 14 (Greensville County). *Lithobates clamitans* was the most commonly found anuran throughout the surveys being found at 54 of 60 surveys (90% of surveys in its known range). *Lithobates catesbeianus* was the second most commonly found anuran being found at 51 of 60 surveys

(85% of surveys in its known range) (Table 5). *Anaxyrus quercicus*, *Hyla gratiosa*, and *Pseudacris nigrita* were not found at any survey despite 3, 9, and 5 surveys occurring in their known ranges, respectively. Eighteen species of anurans were found in 50% or less of the surveys conducted in their known ranges (Table 5). As a group, chorus frogs (genus *Pseudacris*), excluding *Pseudacris crucifer*, were among the least commonly reported anurans during surveys, even in surveys within their known ranges (Tables 4 and 5). The newest anuran recently added to Virginia's species list, *Lithobates kauffeldi*, was only found at 2 of the 11 surveys in its known range (18%). Surveys occurred across the state and in all physiographic provinces (Figure 1). The county/city surveyed most frequently was Buckingham County, with four surveys conducted in that location. Five counties were surveyed 3 times each and 11 counties/cities were surveyed two times each. The other counties/cites were only surveyed once. The coastal plain physiographic province was surveyed most frequently, with 37% of surveys occurring there (Figure 2). The coastal plain was surveyed at a higher rate compared to its estimated percentage of land area compared to other physiographic provinces (Figure 2). The piedmont was surveyed at a lower rate than its estimated percentage of land area compared to other physiographic provinces (Figure 2). Surveys were conducted from March until September where 85% of the surveys occurred in April, May, and June (Figure 3). Forty-six percent of all surveys were conducted in May.

DISCUSSION

The VHS surveys have contributed a vast amount of natural history and distributional data on the anurans of Virginia. These surveys have contributed data on species associations, habitat associations, calling dates, color variations, diseases, and many new distributional or county/ records. Since most of the surveys occurred on public land such as natural area preserves, wildlife management areas, national and state forest land, and state parks, this information has helped land managers better appreciate what species occur at their site. This in turn will allow them to better manage the land for natural species. These surveys, however, often underreport species, most likely due to geographic, seasonal, habitat, and climate factors. Three species of anurans found in Virginia were never found in even one survey and 18 species were in 50% or less of the surveys conducted in their known ranges. In general, species found in very few surveys usually have a restricted geographic distribution, early or late breeding cycles, specialized habitat requirements, and/or breeding requirements tied to heavy rainfall events.

Acris crepitans was well represented in the 60 surveys being found at 31 of 60 surveys or 72% of the surveys within its known range. Its distribution is more oriented to the central and eastern part of the state, which prohibited it from being recorded in surveys to the west. *Acris gryllus* is restricted to the southeastern part of the state which may account for it being reported in only 5 of 60 surveys (5 of 11 surveys in its known range or 45.5%). In areas where these two species are sympatric it is critical for future survey participants to spend extra effort at ensuring the proper identification of each animal captured and calls that are heard.

Two toad species, *Anaxyrus a. americanus* and *Anaxyrus fowleri* are geographically distributed statewide and were well represented in VHS surveys. *Anaxyrus quercicus* is geographically restricted to the extreme southeastern region of the state. In my experience with this species in Virginia,

its breeding is rare, explosive, occurs only at night, and is tied to extreme weather conditions. This is one of the rarest anuran species to be found in Virginia and thus may be why it was not found at any of the three surveys conducted in its known range. *Anaxyrus terrestris*, like the Oak Toad, is also geographically restricted to the extreme southeast. I personally find this species hard to distinguish from *Anaxyrus a. americanus* in phenotype and sometimes call. On average the Southern Toad is smaller than the American Toad in Virginia (Jason Gibson and Paul Sattler, unpublished data). Large and old adult female Southern Toads have pronounced knobs at the posterior ends of the interorbital cranial crests which are not seen on large and old adult American Toads. The call of the Southern Toad has a shorter trill than American Toads, but on warm or cold days each species can make longer or shorter calls. Adding complexity to identification of *A. a americanus*, *A. fowleri*, and *A. terrestris* in Virginia is the fact that all three species can form hybrids (Dodd, 2023). In southeastern Virginia where all three species meet, a hybrid swarm may create individual animals that are very difficult to identify.

Most treefrogs in Virginia, excluding *Hyla chrysoscelis* and *Hyla versicolor*, have a general eastern to southeastern distribution. As such these species were underreported in VHS surveys. In addition, *Hyla cinerea*, *Hyla femoralis*, and *Hyla squirella* have later calling times and may be missed during early May surveys or during a May or June survey with colder or dry weather. The apparent rarity and specificity of habit and climate factors for reproduction may have prevented the VHS from documenting *Hyla gratiosa* during the nine surveys conducted in its known range.

Three large-bodied frog species *Lithobates catesbeianus*, *Lithobates clamitans*, and *Lithobates palustris* have a statewide distribution and were well represented in VHS surveys. *Lithobates plaustris* has an earlier breeding season than the others, so this may be why it was reported in 66.7% of VHS surveys in its known range. *Lithobates kauffeldi* was recently added to the Virginia state anuran list in 2017 and therefore this may account for it only being documented from only 2 of 60 surveys (18.2% of survey within its known range) (Schlesinger et al., 2017). Occurring sympatrically with *Lithobates sphenocephalus* and being phenotypically very similar may add confusion to its identification, causing under-reporting. Although little work on its natural history has been conducted in Virginia, it seems to be a habitat specialist preferring large riparian cypress-gum wetlands (Schlesinger et al., 2018). This preference for a specific breeding site coupled with early reproduction (February and March) may make it harder to find during VHS surveys conducted in May or June. *Lithobates sphenocephalus* was found during 24 of 60 surveys (80% of surveys within its known range). This probably reflects the fact that this species has a more central and eastern geographic distribution and half of the VHS surveys were not conducted where it lives. *Lithobates sylvaticus* has a more central to western distribution in Virginia and an early, short, and explosive breeding season with specialized breeding habitat requirements. These factors naturally reduce the likelihood of it being found in many VHS surveys. Thirty-nine surveys were conducted within its known range, but it was only documented in 33.3% of these surveys. *Lithobates virgatipes* has a spotty distribution in eastern Virginia within the coastal plain. It was only found during 4 of 60 surveys. Of nine VHS surveys conducted in its range it was only found 44.4% of the time. This likely reflects its rarity in Virginia and specialized breeding habitat requirements (Georgel, 2001).

Although it was rare to find, where it was found it was usually abundant.

Anurans in the genus *Pseudacris*, excluding *Pseduacris crucifer*, were likely not often found during VHS surveys because 99% of all surveys were conducted outside their breeding window. These species after breeding are often difficult to find. Within their breeding season, however, it is easy to hear calling males at night and sometimes during the day. Many of these chorus frogs are abundant and widespread, but this is only obvious during the breeding season. Many of Virginia's chorus frogs have restricted distributions and this may be a reason why they appear to be found in fewer surveys. These chorus frogs include *Pseudacris brachyphona* (restricted to the southwestern portions of the state), *Pseudacris brimleyi* (restricted to the eastern part of the state and generally to the coastal plain), *Pseudacris kalmi* (restricted to the Eastern Shore), and *Pseudacris ocularis* (restricted to the extreme southeastern part of the state). Except for *Pseudacris ocularis* these geographically restricted chorus frogs breed in February and March which has been outside the VHS survey time frame 99% of the time. The rarity of *Pseudacris ocularis* records at VHS surveys may also be attributed to its diminutive size and its high frequency call which could be mistaken for an insect or drowned out by louder anurans. *Pseudacris nigrita*, according to our current knowledge, has a restricted distribution but this may be due to it just recently being added to Virginia's anuran species list (Hobson & Moriarty, 2003). With surveys during March and in the right locations this species may be much more common and widespread than is currently known. Because of the similarity in calls, caution should be exercised when using calls to distinguish different species. Call data in addition to a photograph would represent the best way to identify these species more accurately.

Scaphious holbrookii is widespread in Virginia and individual frogs are commonly reported (Gibson & Anthony, 2019). Its breeding behavior is rarely reported because it is explosive, short lived, and tied to specific climatic conditions. These conditions did not occur during any of the 40 VHS surveys conducted in its known range as evidenced by no breeding choruses being recorded. It is unlikely that future VHS surveys will be in the right place at the right time to hear this species calling; however future surveys may find this species more frequently by night searches around the woods and habitat surrounding potential breeding pools and using flashlights to look for eye shine from spadefoots in and near their burrows. This technique was used by Devan-Song et al (2021) to find thousands of spadefoots. Surveying metamorphic toads emerging from breeding pools late in the season (July or August) could also help document this species at more sites.

Moving forward, the VHS could implement a few procedural changes which would help to boost the overall anuran species records for the properties we survey. These would include: (1) For each property surveyed, have a pre-site visit during early March. preferably after or during a rainstorm and at night. (2) At sites where late breeding treefrogs may occur, have a post site visit in June, preferably during or after a rainstorm. (3) During all surveys in all seasons conduct a night survey. Many species of anurans do not call during the day. Nocturnal surveys should occur around potential Eastern Spadefoot breeding habitat using flashlights to look for eye shine from Eastern Spadefoots sitting in or near their burrows. The person organizing a survey should spend time predicting what species of anurans are

possible at a survey site and then use the proper techniques to ensure the maximum number of species are found. This can be done by utilizing the VHS database gateway on the VHS website. By typing in a location, a species list for each county can be generated. By viewing figure 4 the survey coordinator can also predict how many anuran species should be found in a county.

Future surveys could focus on targeting specific anurans. These surveys may be more regional, with the purpose of expanding the known geographic distribution of rare species. The VHS could also create a survey group which on a moment's notice could organize and survey during extreme or rare weather events such as tropical storms or hurricanes. Anurans are among the easiest species to find during a survey and with a little extra effort VHS surveys could better document this group.

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Table 1. Summary of anuran species found during VHS surveys 1 - 14.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Ac			*		*					*	*		*	*
Ag							*							
Aa		*	*			*	*	*	*	*	*	*	*	*
Af					*		*			*			*	*
Aq														
At							*							
Gc							*			*			*	*
Hch	*				*		*			*			*	*
Hci							*			*			*	*
Hf													*	
Hg														
Hs							*						*	
Hv						*					*			
Lca	*	*	*	*	*	*	*	*	*	*	*		*	*
Lcl	*		*	*	*	*	*	*	*	*	*	*	*	*
Lk														
Lp		*	*	*	*	*		*	*	*	*	*		*
Lsp	*						*						*	*
Lsy			*			*						*		
Lv					*									
Pbr														
Pbri														
Pc		*	*		*	*		*	*		*	*	*	
Pf													*	
Pk														
Pn														
Po							*							
Sh										*	*		*	
Total	4	4	7	3	8	7	8	5	5	10	8	5	14	10
Province	C	B	CP	R	C	R	C	R	P	C	B	R	C	C
Month	A	M	A	A	A	M	M	M	M	M	M	M	MJ	J
FIPS	181	077	153	167	033	165	550	167	007	103	015	197	081	036
		173		169				173	147	119	125			
		191						185		133				
								191						
Reference	112	122	132	142	152	171	181	191	201	212	221	231	241	242

Table 2. Summary of anuran species found during VHS surveys 15 - 29.

	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
Ac		*		*	*		*		*	*				*	
Ag						*									
Aa	*	*	*	*	*		*		*	*	*	*		*	*
Af		*		*	*	*	*			*		*	*	*	
Aq															
At						*									
Gc					*	*									
Hch		*		*	*	*	*		*	*				*	
Hci		*			*	*							*	*	
Hf					*										
Hg															
Hs						*									
Hv			*	*					*	*	*	*			*
Lca	*	*	*	*	*	*	*		*	*	*	*	*	*	*
Lcl	*	*	*	*	*	*	*	*	*	*	*	*		*	*
Lk															
Lp		*	*	*						*	*	*			*
Lsp		*		*	*	*	*			*			*		
Lsy	*		*								*	*			
Lv															
Pbr															
Pbri							*								
Pc	*	*	*	*	*	*		*	*	*	*	*	*	*	*
Pf				*						*	*				
Pk															
Pn															
Po															
Sh														*	
Total	5	10	7	11	11	11	8	2	7	11	8	8	5	9	6
Province	R	C	P	P	C	C	C	B	P	P	B	R	C	C	R
Month	M	J	M	M	Ju	J	M	J	J	M	AAu	Ju	J	M	J
FIPS	005	159	089	083	036	550	095	077	019	117	155	017	131	059	173
	017		141		127		199								
Reference	261	262	271	281	282	291	291	292	301	302	302	311	311	312	321

Table 3. Summary of anuran species found during VHS surveys 30 - 45.

	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Ac	*		*		*	*	*	*		*		*	*			
Ag												*			*	
Aa	*	*	*		*	*	*	*	*	*		*	*	*		*
Af		*	*	*	*	*	*	*		*		*	*	*	*	
Aq																
At				*												
Gc				*		*									*	
Hch			*		*	*	*	*	*			*				
Hci	*		*	*		*		*				*				
Hf																
Hg																
Hs				*												
Hv		*				*	*			*			*			
Lca	*	*	*	*	*	*	*	*	*	*	*		*			
Lcl	*	*	*	*	*	*	*	*	*	*		*	*		*	*
Lk															*	
Lp	*	*			*		*	*	*	*	*			*		
Lsp	*		*	*	*	*		*				*			*	
Lsy																*
Lv			*												*	
Pbr									*							
Pbri																
Pc	*	*	*	*	*	*	*	*	*	*	*	*		*	*	*
Pf															*	
Pk																
Pn																
Po																
Sh																
Total	8	7	10	9	9	11	9	10	7	8	3	9	6	4	9	4
Province	C	R	C	C	P	P	P	C	A	P	B	C	P	B	C	BR
Month	Au	M	J	M	M	J	MJ	M	JJu	M	S	M	J	M	AM	S
FIPS	099	187	033	810	041	117	145	193	051	029	063	036	125	035	183	770
											141					
Reference	331	331	332	332	341	341	351	352	361	361	362	371	371	372	381	381

Table 4. Summary of anuran species found during VHS surveys 46 - 60.

	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	Total
Ac		*		*			*	*	*	*	*		*	*		31
Ag		*														5
Aa		*			*	*	*	*	*	*	*	*		*		46
Af		*				*	*	*	*	*	*	*	*	*	*	37
Aq																0
At																3
Gc											*		*		*	12
Hch						*	*	*	*		*		*		*	28
Hci								*			*		*		*	19
Hf																2
Hg																0
Hs								*			*					6
Hv		*			*		*		*			*				19
Lca		*	*	*	*	*		*	*		*	*	*	*	*	51
Lcl		*	*	*	*	*	*	*	*		*	*	*	*	*	54
Lk																2
Lp			*	*		*	*	*	*		*	*		*		36
Lsp		*						*			*		*		*	24
Lsy						*	*		*			*		*		13
Lv													*			4
Pbr																1
Pbri																1
Pc			*	*			*	*	*	*		*	*		*	47
Pf						*	*									7
Pk															*	1
Pn																0
Po																1
Sh								*					*			6
Total	0	8	4	5	4	8	10	12	10	4	11	8	11	7	9	
Province	R	C	R	P	R	A	P	P	P	P	C	P	C	P	C	
Month	M	AM	J	S	J	MJAu	M	AM	S	J	M	M	J	M	MaJ	
FIPS	165	127	191	011	163	105	177	007	011	011	700	043	033	153	001	
				029					029	029		061				
Reference	381	382	382	391	391	392	392	401	401	401	401	402	412	421	422	

Table 5. Summary of the % of surveys where species were found in their known range.

	# Surveys in species known range	% of Surveys species was documented in its known range	% of Surveys in species known range but was not documented
Ac	43	72.1%	27.9%
Ag	11	45.5%	54.5%
Aa	58	79.3%	20.7%
Af	60	61.7%	38.3%
Aq	3	0%	100%
At	9	33.3%	66.7%
Gc	35	34.3%	65.7%
Hch	45	62.2%	37.8%
Hci	36	52.8%	47.2%
Hf	18	11.1%	88.9%
Hg	9	0%	100%
Hs	15	40%	60%
Hv	41	46.3%	53.7%
Lca	60	85%	15%
Lcl	60	90%	10%
Lk	11	18.2%	81.8%
Lp	54	66.7%	33.3%
Lsp	30	80%	20%
Lsy	39	33.3%	66.7%
Lv	9	44.4%	55.6%
Pbr	14	7.2%	92.8%
Pbri	17	5.9%	94.1%
Pc	59	78%	22%
Pf	45	15.6%	84.4%
Pk	2	50%	50%
Pn	5	0%	100%
Po	4	25%	75%
Sh	44	13.6%	86.4%

Anaxyrus fowleri (Fowler's Toad) VA: Gloucester County, Private Residence. 9 June 2022. Chad Walker.

Polymely: Some of the rarest and most interesting observations we can make of anurans come from deviations of the normal color or morphological phenotype. Some anomalies such as albinism can be easy to spot while others are exceedingly difficult to observe like an extra eye in the mouth cavity. Polymely, as defined by Henley and Vershinin, (2017. Studies on anomalies in natural populations of amphibians. Mertensiella 25: 9-48.) is an anomaly which results in the duplication of a complete limb. This specific anomaly has been reported several times in Fowler's Toads in Virginia. Johnston, Morgan, and Paterson (1971. Observations on a captured environmentally adapted monster amphibian (Bufo sp.). Virginia Journal of Science 22:98 (abstract)) reported finding a fully grown adult female Fowler's Toad in Virginia with missing eyes and with an extra appendage emerging from the ventral surface of the pectoral girdle. The extra appendage was described as non-articulate and missing digits. Mitchell and Burwell (2004. Malformed fowler's toad (Bufo fowleri) from the Shenandoah Valley of Virginia. Banisteria 24: 51-52) reported finding a juvenile Fowler's Toad in Virginia exhibiting polymely, brachydactyly (abnormally short digits), and polydactyly (extra digits). The extra appendage was attached to the pectoral region and exhibited a shortened humerus, radius, and ulna with seven stunted finger buds. Mitchell and Burwell (op. cit) stated that an online database (http://frogweb.nbii.gov) documented other anomalies observed in Virginia anurans. This website no longer has an active link thus this material is either lost or impossible to find. This highlights the importance of publishing rare anomalies using print literature as opposed to digital sites which might disappear. The purpose of this note is to report another observation of a limb anomaly in *Anaxyrus fowleri*.

On 9 June 2022 a seemingly healthy adult Fowler's Toad was found at a private residence in Gloucester County, Virginia. The extra appendage was attached on the right side adjacent to the pectoral girdle region. The appendage included a humerus, radius, ulna, and 4 digits. The thumb digit was bifurcated into two smaller parts. The extra arm protruded to the right side and did not touch the ground. The animal had two normal front limbs and was able to move without restriction. We encourage everyone to report all color or morphological anomalies observed in Virginia. A digital photo has been deposited in the VHS Digital Archive (# 753) to document this observation.

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***Anaxyrus fowleri* (Fowler's Toad)**: VA. Greene County, 245 Bird Lane, Stanardsville. 7 June 2023. Rita Swain.

County Record: Fowler's Toad has a state-wide distribution in Virginia. They have been verified in 78 of the 95 counties. There are, however, fewer records from the mountainous counties along the western border. They frequent dry well drained habitats and are often seen in woodlands and agricultural fields (https://virginiaherpetologicalsociety.com/amphibians/frogsandtoads/fowlers-toad/index.php). On 7 June 2023 I was in my yard when I noticed movement. I found a toad and took some photos which I sent to the VHS for identification. I was informed the toad was a Fowler's Toad, and there was no record of the species in Greene County. This observation thus represents the first record for Greene County. It is reported from all surrounding counties except Rockingham. A photo was submitted as a voucher (Archive #752) for this record.

Rita Swain
Stanardsville, VA

***Hyla cinera* (Green Treefrog):** VA: Nottoway County, 5001 East Patrick Hwy, Burkeville, VA 23922. 6 October 2022. James Ritchie and Stephen Jones.

County Record: The Green Treefrog is found in virtually every county in eastern Virginia, and most cities (https://www.virginiaherpetologicalsociety.com/amphibians/frogsandtoads/green-treefrog/green_treefrog.php), as well as introduced populations in Craig and Pulaski Counties. They can live in close association with man and can be found in homes and buildings occupied by man. They can hunt at night using the lights people use to illuminate homes and businesses, which attract insects which they consume. On October 26, 2022, James Ritchie provided Stephen Jones a photograph (VHS Archive #731) of a Green Treefrog, which he found on a building at his workplace at 5001 East Patrick Hwy, Burkeville in Nottoway County. This record fills the last county gap in the Green Treefrog distribution in eastern Virginia, although it is possible additional records could push the distribution farther west.

Stephen Jones

Photograph by: James Ritchie, Burkeville, Va

Hyla femoralis (Pine Woods Tree Frog) VA: Powhatan County, in a seasonal wetland just South of State Route 711 (Huguenot Trail), between State Route 624 (Venita Road) and State Route 607 (Huguenot Springs Road) (37.56102, -77.69815) 08 May 2023. Brian Munford

New county record: The Pine Woods Treefrog in Virginia has a distribution in the southeast portion of the state with the western-most location in Amelia County. On 08 May 2023, and on multiple nights thereafter, a strong chorus of pine woods tree frogs was noted and recorded in Powhatan County. This observation fills a gap along the western extent of the known range of this species. (Mitchell J.C., and K.K. Reay, 1999, Atlas of Amphibians and Reptiles in Virginia, Special Publications No. 1, Virginia Department of Game and Inland Fisheries, Richmond, VA, 122 pp.; Tobey, 1985, Virginia's Amphibians and Reptiles: A Distributional Survey). A digital recording has been deposited in the VHS archive (Digital Voucher # 749) as a voucher for this record.

Brian Munford
2537 Venita Road
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***Hyla versicolor* (Gray Treefrog).** VA: City of Lynchburg, Drainage pond by roundabout for Liberty Mountain Drive/US 460 (N 37°20'58.2"; W 79°10'35.3"). 29 April, 2023. Logan and Judah Wise.

City Record: Judah Wise and I were walking the Liberty University sidewalks in the evening between 8pm and 10pm, which is located in the Lynchburg city jurisdiction. The evening was about 21C and fairly humid, having rained recently. After walking past the Slim Chickens restaurant on campus, we heard the noise of treefrogs calling further on. We approached a roundabout on Liberty Mountain Drive and heard the calls coming from a drainage pond next to the ramp onto US highway 460. We made our way down into the drainage pond area and shone a spotlight on and around the edges of the water. We located, using the light, multiple male Gray Treefrogs calling and also saw various females sitting in the water. We were able to obtain various pictures of the frogs and took videos with audio of the males calling, allowing us to determine the species was *Hyla versicolor* and not *Hyla chrysoscelis.* The Gray Treefrog has been verified in 56 counties and 4 cities in Virginia, including all counties surrounding the City of Lynchburg. An audio file was submitted to the VHS as a voucher for this observation (Archive #747).

Logan Wise
Lynchburg City, VA.

***Lithobates spenocephala* (Coastal Plains Leopard Frog)** VA. City of Norfolk, Norfolk Botanical Gardens, swamp near Lake Whitehurst (36.9046978, -76.1966829), 26 February 2023. Mike and Juliana Sayre.

City Record: We were visiting the Norfolk Botanical Gardens to look at the trees in bloom and trying to find some birds and other wildlife to photograph. While walking on the trail near the lake and a marshy/swampy area, we heard frogs calling loudly from the shallow pools in the marshy area. We looked and saw multiple frogs calling and swimming around. We stayed for a while taking photos and some video to record the calls since they

were so loud and constant. We sent photos (VHS Archive #721) and a sound recording to the VHS to confirm the identity as Coastal Plains Leopard Frogs, and received confirmation. The species is found throughout southern Virginia and in every city surrounding Norfolk, so this report fills a gap in the distribution.

Mike Sayre
Norfolk VA

***Pseudacris crucifer* (Spring Peeper)**: VA: Lunenburg County: Keysville, VA 23947 (36.97319, 78.29334), 9 April 2021. Kristin E. Duty and John W. Duty

County Record: The Spring Peeper (*Pseudacris crucifer*) is ubiquitous in Virginia, being verified in 89 of the 95 counties (https://www.virginiaherpetologicalsociety.com/amphibians/frogsandtoads/northern-spring-peeper/northern_spring_peeper.php). The loud choruses are familiar to most who spend any time out of doors. They are easy to hear, but usually hard to see, typically calling from concealed locations. Of the six counties lacking a record, it is probably due to a lack of survey effort in those locations. Here I report the first record of a Spring Peeper from Lunenburg County.

On 9 April 2023 one Spring Peeper was captured and photographed at a private pond located at 36.97319, 78.29334 near Keysville. Several other Spring Peepers were also heard calling at the site. This report is a confirmation of the species for the county. The species has previously been recorded in all surrounding counties (Op. Cit.), so this record fills a gap in the known range of the species in Southside Virginia and reduces the counties lacking a record to five. A photograph was submitted to the VHS (Archive # 730) with this note as confirmation of this record.

Kristin Duty
3624 Lunenburg County Road
Keysville VA

***Ambystoma jeffersoni* (Jefferson Salamander):** Va. Rockbridge Co., 165 Alms Croft Lane (37°50'18.3"N 79°24'19.5"W). 4 November 2021. Shannon Spencer.

County Record: The Jefferson Salamander in Virginia is found along the western tier of counties in montane habitats. On 4 November 2021 I was walking on the property where I grew up and saw a large salamander in an unused swimming pool. I photographed the salamander, but did not do anything with it at the time. I had never seen such a large salamander on the property, although there are bullfrogs, gray treefrogs and green treefrogs breeding in it. I recently found the photograph again and sent it to the VHS for identification. I was informed it was a Jefferson Salamander, and that there was not a record of it in Rockbridge County. They are found in all counties to the north, west and south of Rockbridge, so this record fills a gap in the distribution (Mitchell and Reay, 1999. Atlas of Amphibians and Reptiles in Virginia. Virginia Department of Wildlife Resources, Richmond VA. 122pp.). The photograph was submitted to the VHS Archive (# 718) as a voucher for the observation.

Shannon Spencer
Lexington VA

***Amphiuma means* (Two-toed Amphiuma).** VA: James City County. Greensprings Interpretive Trail (37.2484110, -76.7902899). 31 December 2022. The Rev'd Christopher L. Epperson and Timothy P. Christensen.

Predation/Behavior: While hiking along the Greensprings Interpretive Trail where a wooden boardwalk traverses a wetland, a red-shouldered hawk (*Buteo lineatus lineatus*) was observed on the lower limb of a tree approximately 3 meters above marsh habitat consuming prey. A photograph of the hawk with its prey was obtained. Consultations agreed that the prey was in fact an amphiuma based on the photograph. The time was 1534 h. Weather conditions consisted of overcast skies with a light wind. Air temperature was estimated at 6° C. The immediate habitat consisted of marsh bordered by mixed hardwoods and loblolly pine. This opportunistic observation may contribute interesting points to consider in the biology of *Amphiuma means* since comprehensive studies on its ecology appears limited (Mitchell. J.C. 2013. Body size and diet of Amphiuma means (Caudata: Amphiumidae) from southeastern Virginia. Journal of the North Carolina Academy of Science 129(2): 66–68.). Red-shouldered hawks are diurnal opportunistic predators feeding on a variety of prey including mammals, fish, birds, and invertebrates as well as reptiles and amphibians (Peterson, J.M.C., and S.T. Crocoll, 1992. Red-shouldered hawk. *In* K.J. Schneider and D.M. Pence. Migratory Nongame Birds of Management Concern in the Northeast, U.S. Department of the Interior, U.S. Fish and Wildlife Service. 400 pp.). Regarding amphibians, anurans have been reported as being important prey of red-shouldered hawks (Platt, S.G. and T.R. Rainwater. 2019. Bufophagy and carcass processing by a red-shouldered hawk (Buteo lineatus). Journal of Raptor Research 53(3):

346–349.). *Buteo lineatus* has been associated with swamp and riparian habitats and typically capture prey from perches overhanging a water course or wetland (Jacobs, J.P. and E.A. Jacobs. 2002. Conservation assessment for red-shouldered hawk (Buteo lineatus) National Forest of north central states. USDA Forest Service Eastern Region, Milwaukee, Wisconsin. 100 pp.). Such habitats and hawk behavior would be conducive to predation on *Amphiuma means*. The importance of amphiumas as prey for *Buteo lineatus* is not well documented in the literature. *Buteo lineatus* had been recorded feeding on an *Amphiuma means* carcass in Florida; however, it was uncertain whether this was a case of kleptoparasitism (Herman J.E., W. Brosse, Z.S. Stone, M. Wolok, C. Ugarte Whelan, K.R.T. Whelan, S. Clem, and M. Rumbach. 2016. Natural History Notes. Herpetological Review 47(3): 433.). Interestingly, Shaffer (2017. Food fight! White Ibis vs. red-shouldered hawk. Birding Pictures. http://www.birdingpictures.com/food-fight-white-ibis-vs-red-shouldered-hawk/) posted a sequence of photographs of an amphiuma initially captured by a white ibis (*Eudocimus albus*) and then stolen by a red-shouldered hawk at the Corkscrew Swamp near Naples, Florida. The observation at the Greensprings Interpretative Trail suggests predation. The literature suggests *Amphiuma means* is nocturnal in habit (Carr, A.F. 1940. A contribution to the herpetology of Florida. University of Florida Biological Publications Science Series 3(1). University of Florida, Gainesville, Florida. 118pp.; Bishop, S.C. 1943. A handbook of salamanders. The salamanders of the United States, of Canada, and of Lower California. Comstock Publishing Company, Ithaca, New York. 555pp.; Bancroft, G.T., J.S. Godley, D.T. Gross, N.N Rojos, D.A Sutphen and R.W. McDiarmid. 1983. Large-scale operations management test of use of the white amur for control of problem plants. The herpetological fauna of Lake Conway: species accounts. U.S. Army Engineer Waterways Experiment Station, Aquatic Plant Control Research Program, Miscellaneous Paper A-83-5, Vicksburg, Mississippi. 252pp.; Petranka, J.W. 2010. Salamanders of the United States and Canada. Smithsonian Books, Washington, D.C. 587pp.; Cochran, D.M. and C.J. Goin. 1970. The new field book of reptiles and amphibians. G.P. Putman's Sons, New York. 359pp.; Smith, H.M. 1978. Amphibians of North America. Golden Press, New York. 160pp.; Conant, R. 1958. A field guide to reptiles and amphibians of the United States and Canada east of the 100th meridian. Houghton Mifflin Co., Boston, MA. 366pp.; and Bishop, S.C. 1927. The amphibians and reptiles of Alleghany State Park. New York. State Museum Handbook No. 3, University of the State of New York, Albany, NY. 137pp.) and that amphiumas hibernate (Barbour, R.W. 1971. Amphibians and reptiles of Kentucky. University of Kentucky Press, Lexington, KY. 334pp.; and Neill, W.T. 1948. Hibernation of amphibians and reptiles in Richmond County, Georgia. Herpetologica 4(3): 107–114.) or are less active during winter (Johnson, S.A. and R.B. Owen. 2005. Amphiuma means Garden, 1821 Two-toed Amphiuma. *In* Lannoo, M. Amphibian Declines: The Conservation Status of United States Species. University of California Press, Berkley, California. 1094 pp.). This observation may imply the amphiuma exhibited diurnal activity and was not hibernating.

Rev'd Christopher L. Epperson
Rector, Bruton Parish Church
Williamsburg, Virginia

Timothy P. Christensen
106 Davids Way
Yorktown, Virginia

***Pseudotriton ruber* (Northern Red Salamander)**: VA. City of Lynchburg, 5134 Boonsboro Rd. 23 May 2023. Timi Plyter.

City Record: The Northern Red Salamander was recently designated the official Virginia Amphibian. This is due in part to its spectacular coloration and near state-wide distribution. It has been verified in 76 of the 95 counties and 7 cities. It is absent only from the southeastern portion of the state (https://www.virginiaherpetologicalsociety.com/amphibians/salamanders/northern-red-salamander/index.php). On 23 May 2023 I was doing yard work and picked up a pile of leaves. To my surprise, I saw a large, bright red salamander under the leaves. I took a photograph and sent a copy to Paul Sattler who identified it as a Northern Red Salamander. I was informed there was no verified record of this species for the City of Lynchburg, although it is documented from every surrounding county. The photograph was entered into the VHS Digital Archive (#742) as a voucher for the species. This record helps fill a gap in the distribution of this species in central Virginia.

Timi Plyter
Lynchburg, VA

***Coluber Constrictor* (Northern Black Racer)**: VA. Richmond City, Robins Nature Center at Maymont (37.5378000, -77.4739200). 15 April 2023. Griffin Blankinship and Erica Lyon

City Record: The Northern Black Racer is found throughout most of the eastern United States. In Virginia, it is documented in 85 of the 95 counties and in 15 cities. This is a large snake, known for its aggressive nature. They are an alert snake, hunting with its head up and aware of its surroundings.

On 15 April 2025 Griffin Blankinship and I were looking for snakes around Richmond. A northern black racer was found outside the Robins Nature Center at Maymont. The racer was found basking on top of a railroad tie in some bushes adjacent to the asphalt parking area. The racer was full grown and in shed with some dermal lesions present. I took some digital photos and sent one to the VHS as a voucher (VHS Archive # 742) for this observation. The racer is found in all counties surrounding the City of Richmond, so this record helps fill a gap in the distribution.

Erica Lyon
Richmond, VA

***Diadophis punctatus* (Ring-necked Snake)** VA. City of Radford, (N 37.12576°, W 80.58913°). 25 March 2023. Nicklas Buchbinder and Kalee Shahayda.

City Record: The Ring-necked Snake has a state-wide distribution in Virginia. It is verified in 86 of the 95 counties, and 9 cities thus far. Virginia is in the middle of the transition between the Northern and Southern subspecies. Both northern and southern individuals, as well as a variety of intermediates can be found in central Virginia. On 25 March, Kalee Shahayda and I were looking for snakes along the railroad tracks running along the east side of the New River on the southwest side of Radford. We came across some sheets of plastic siding. Upon flipping them we found two Northern Ring-necked Snakes and a Garter Snake. Photographs were sent to the VHS as a voucher (Archive #743). While the Ring-necked Snake is found in all the counties surrounding the City of Radford, this the first verification for the City itself, helping to fill a gap in the distribution in western Virginia.

Nicklas Buchbinder
Radford, VA

***Haldea striatula* (Rough Earthsnake)**. VA: City of Emporia. Richardson Memorial Library, 100 Spring St (36°41'13"N, 77°32'27"W). 3 May 2022. Amy Lehman.

City Record. Library staff notified me that a small snake had been killed outside the front entrance the prior day. Knowing I would want to see it, they placed the deceased snake in a container and set it aside for me. The snake was approximately 24 cm long and appeared to have been healthy prior to its demise. I took photos for submission to VHS to confirm the identification (VHS Archive # 736). The Rough Earthsnake has been verified in ten (10) counties and six (6) cities. The City of Emporia lies completely within the County of Greensville. Although the Rough Earthsnake has not been verified in Greensville County, its presence has been verified in two adjacent localities (Brunswick and Southampton Counties), so this observation further informs the geographic distribution of the species. The weather for this observation was mostly cloudy and 14.5°C.

Amy Lehman
Southampton County

***Heterodon platyrhinos* (Eastern Hog-nosed Snake):** VA. City of Charlottesville, Along the Rivanna River Trail (38.0290593, -78.4567373). 10 April 2023. Bernice Brythorne.

City Record: The Eastern Hog-nosed Snake has a state-wide distribution, being verified in 81 of the 95 counties and 10 cities thus far. It is known for its defensive behavior of spreading its neck like a cobra, hissing, and striking with its mouth closed, as well as feigning death by rolling onto its back and not moving. There is a "normal" color pattern of dark irregular blotches on a lighter background and a melanistic (all black) color phase. In recent years some colorful snakes with an orangish background have been reported. Their diet consists mostly of toads, where the enzymes in the snake's digestive track breaks down the venom these toads contain (https://www.virginiaherpetological society.com/reptiles/snakes/eastern-hog-nosed-snake/eastern_hognose_snake.php).

On 10 April 2023 I was walking back along the Rivanna River trail on a paved section that goes through a forested riparian area. it was sunny, about 22-24ºC and 1430h in the afternoon. The snake was stretched out along the edge of grass and pavement. It was around one meter and when it noticed me started to try and flatten the skin around its neck. I took a few photos to help with identification and then as I moved past, it moved into the sandy and grassy area off the edge of the trail. The Eastern Hog-nosed Snake if found in all the counties surrounding the City of Charlottesville so this observation helps fill a gap in the distribution in central Virginia. A photo of the snake was submitted to the VHS Archive as a voucher (#733).

Bernice Brythorne
Charlottesville VA

***Lampropeltis getula* (Eastern Kingsnake)**: VA. Poquoson City, Freeman Lane off of the 200 block of Wythe Creek Rd. (37.111370,-76.389758). 1 April 2023. Jesse Maxwell.

City Record: The Eastern Kingsnake's distribution is primarily in eastern Virginia. This is a large snake known for its "chain-link" pattern of light marks on a black body.

On 1 April 2023 I was walking back to my home at 8 Freeman Lane off of the 200 block of Wythe Creek Rd. (37.111370,-76.389758) and interrupted a snake crossing the entrance of my driveway. I have seen this snake or potentially other snakes of the same species in and around the ditch in my yard for several years. I found one in my garage one year. I believe there are several individuals if this species around my house, and have multiple pictures of this species

While the Eastern Kingsnake has been documented in every City and County surrounding Poquoson, it has never been reported from the City itself (https://www.virginiaherpetologicalsociety.com/reptiles/snakes/eastern-kingsnake/eastern_kingsnake.php). This record thus fills a gap in the distribution in Virginia's eastern seaboard. A digital photo was submitted to the VHS Archive (#727) as a voucher.

Jesse Maxwell
Poquoson, VA

Landing Park in the City of Franklin when we observed a large snake basking on the riverbank. The snake was approximately 1.3m long and appeared to be in good condition. I submitted photos to the VHS to confirm the identification (Archive #715). The Brown Watersnake has been verified in nine (9) counties and six (6) cities, including one adjacent locality (Isle of Wight County), so this observation further informs the species distribution. The weather for this observation was cloudy and 22°C.

Amy Lehman
Southampton County

Nerodia taxispilota (Brown Watersnake) .VA: City of Franklin. Barrett's Landing Park on the Blackwater River (36°40'25"N, 76°55'04"W). 10 February 2023. Mike Blythe and Amy Lehman.

City Record: Mike Blythe and I were searching for herpetofauna at Barrett's

***Nerodia taxispilota* (Brown Watersnake):** VA. Southampton County on the Nottoway River near the Bronco Rod and Gun Club. 7 May 2023. Jason Gray.

County Record: The Brown Watersnake is found in 9 counties and 6 cities in Virginia, which mark the most northern extent of this

species range in the United States (https://www.virginiaherpetologicalsociety.com/reptiles/snakes/brown-watersnake/ index.php)..On 7 May 2023 I was Bass fishing on the Nottoway River near the Bronco Rod and Gun Club when I saw a snake basking on a log. I obtained a photograph and sent it to the VHS Identification page (VHS Archive # 741) for verification. This record for Southampton County is just west of the nearest records in Isle of Wight County and Suffolk City.

Jason Gray

hunts it major prey, softshell crayfish. On 31 May 2020 I observed and photographed (VHS Archive #732) a Queensnake at a boat ramp in Big Island, Virginia. The Queensnake was located in some sapling trees overhanging the waters of the James River. I observed the snake for several minutes before photographing it. It was likely in the area due to the large quantities of crayfish that congregate at the ramp to feed on the disposed byproduct of fish caught by anglers.

Stephen Jones

***Regina septemvittata* (Queensnake)** VA: Amherst Co., Snowden Boat Ramp, Big Island. (37.59719° N, 79.38926° W). 31 May 2020. Stephen Jones.

County Record: The Queensnake (*Regina septemvittata*) is found throughout most of western Virginia (https://www.virginiaherpetologicalsociety.com/reptiles/snakes/queen-snake/queen_snake.php). It is typically found along streams and creeks where it

***Regina septemvittata* (Queensnake)** VA. City of Covington, just southeast of the intersection of Co. Rt. 600 and US 60 at the "Humpback" bridge over Dunlap Creek. 11 April 2023. Paul Manganaro

City Record: The Queensnake has a wide distribution in Virginia outside the Coastal Plain. It is found in 54 counties and 6 cities (https://www.virginiaherpetologicalsociety.com/reptiles/snakes/queen-snake/queen

_snake.php) in the western two-thirds of the state. It is notable for its unusual diet on softshell crayfish, so it is usually found along streams with good crayfish populations. One of the areas lacking records are the four counties ranging from Highland in the north to Botetourt in the south. Here I report the first record of a Queensnake from the City of Covington, in the middle of Alleghany County.

Just southeast of the junction of Co. Rt. 600 and US 60 in Covington VA, there is a covered bridge (the Humpback Bridge) crossing Dunlap Creek, a tributary of the Jackson River. On 11 April 2023 I followed the trail from the Humpback Bridge Wayside on Rt. 600 to Dunlap Creek. There I saw and photographed a Queensnake along the block wall next to the creek on the south side of the bridge, basking in the sun. A copy of the photograph was sent to the VHS and entered into the VHS Archive (# 729). This record helps fill a gap in the distribution of the Queensnake in western Virginia, and suggests searching in Highland, Bath, Alleghany and Botetourt Counties might be productive.

Paul Manganaro
Hot Springs VA

Storeria dekayi (Dekay's Brownsnake). VA: City of Emporia. Richardson Memorial Library, 100 Spring St (36°41'13"N, 77°32'27"W). 19 December 2022. Tsia Harrison and Amy Lehman.

City Record. Tsia Harrison, age 7, told me she observed a snake on the sidewalk while walking toward the Richardson Memorial Library entrance. She accompanied me to view her find. We observed a deceased Dekay's Brownsnake lying on the sidewalk, ventral side up. The snake was approximately 25 cm long and appeared to be in good condition, with the exception of a small, depressed area near the head. I took photos for submission to VHS to confirm the identification (Archive #719) and placed the snake in the grass beside the library. The Dekay's Brownsnake has been verified in sixty (60) counties and fifteen (15) cities. The City of Emporia lies completely within the County of Greensville. Although the Dekay's Brownsnake has not been verified in Greensville County, its presence has been well documented in all adjacent localities (Brunswick, Dinwiddie, Sussex, and Southampton Counties), so this observation further informs the geographic distribution of the species. The weather for this observation was partly sunny and 5.5°C.

Amy Lehman
Southampton County

***Storeria dekayi* (Dekay's Brownsnake).** VA: Greene Co., 204 Hall Drive, Barboursville, (38.1945401, -78.3865198) 12 June 2022. Lane D. Gibbons.

County Record: Dekay's Brownsnakes are secretive, nocturnal, and typically found beneath surface objects in a variety of hardwood, mixed, and pine forests/woodlands as well as grasslands, old fields, woodlots, and urban areas (https://www.virginiaherpetologicalsociety.com/reptiles/snakes/brownsnake/brownsnake.php). Its distribution is somewhat scattered throughout the state but appears most concentrated in the piedmont and coastal plain. This record documents a first report for the species in Greene County.

The specimen was found perched in a boxwood (*Buxus*) shrub in our front garden. Photographs were taken of the dorsum and venter, and the snake was left undisturbed. Surrounding our residence is a mixed hardwood forest with ample coarse woody debris and substrates dominated by oak and beech litter. A photographic voucher was submitted to the VHS (Archive #724), and identification was graciously confirmed by the VHS. This observation was made on June 12, 2022, at 1400 in the southeast corner of Greene County, unsurprising giving the species' known presence in adjacent Albemarle and Orange Counties. Daytime weather: Clear Sky; Temperature, high of 29°C; Relative Humidity, low of 61%; Winds, predominantly south, avg. 4.5mph; Precipitation, <0.15cm.

Lane D. Gibbons
Barboursville VA

***Storeria dekayi* (Dekays Brownsnake)**: VA: Lunenburg County: 3624 Lunenburg County Road (Rt. 40), Keysville, Va (36.9996212, -78.3086566), 30 October 2022. Kristin E. Duty and John W. Duty

County Record: *Storeria dekayi*, Dekay's Brownsnake was identified at a Lunenburg County residence located at 36.9996212, -78.3086566 on 30 October 2022. This report is a confirmation of the species occurrence for the county. The species has been recorded in all surrounding counties except Charlotte. The Virginia distribution is virtually statewide although few records exist for the more montane areas. This record helps fill a gap in the verified range in southern Virginia. A photograph of the snake was submitted to the VHS (Archive #716) as a voucher for this observation.

Kristin Duty
3624 Lunenburg County Road
Keysville Va

***Storeria occipitomaculata* (Red-bellied Snake).** VA: Greene Co., 204 Hall Drive, Barboursville, (38.1947164, -78.3866720) 10 October 2022. Lane D. Gibbons

County Record: Red-bellied Snakes are secretive and primarily nocturnal, but commonly found beneath surface objects and in leaf litter and grass substrates (https://www.virginiaherpetologicalsociety.com/reptiles/snakes/northern-red-bellied-snake/northern_red-bellied_snake.php). They are habitat generalists, found in a variety of dry-mesic to xeric hardwood, mixed, and pine forests/woodlands as well as old fields, and both agricultural and urban woodlots (Op. Cit.). The species is distributed through much of the state but is absent from the Eastern Shore and largely absent from the southwest Appalachian Plateau, Ridge and Valley, and Blue Ridge provinces. This record documents a first report for the species in Greene County.

The specimen was discovered on the steep slope of an intermittent drainage, beneath leaf litter and grassy substrates while hand-clearing a dense population of Japanese stiltgrass (*Microstegium vimineum*). Multiple photographs were taken before the snake was released into adjacent leaf litter. The area is dominated by mixed hardwood forest with ample coarse woody debris and substrates dominated by oak (*Quercus*) and beech (*Fagus*) litter. Soils are primarily dry-mesic. A photographic voucher was submitted to the VHS (Archive #725), and identification was graciously confirmed. This voucher is for one of two specimens located in the same area on the same day. This observation was made on October 10, 2022, at 1730. This Greene County record fills a gap in the species' distribution as there are already recorded vouchers for all surrounding counties. Daytime weather: Clear Sky; Temperature, high of 21°C; Relative Humidity, low of 26%; Winds, predominantly southeast, avg. 2mph; Precipitation, 0cm.

Lane D. Gibbons
Barboursville VA

***Storeria occipitomaculata* (Red-bellied Snake):** VA. Appomattox County, Appomattox, Route 24 (37.452928,-78.716928). 9 November 2019. Jennifer Clark

County Record: The Red-bellied Snake in Virginia has an almost state-wide distribution. It is known from only Scott County in the far southwest. They are well represented in central Virginia. On 9 November 2019 I was cleaning out a mess of brambles to make a garden when I came across a small snake with a bright orange belly. I took some photos and sent them to the VHS when I was informed there was no verified record for Appomattox County. They are known from all other surrounding counties except Amherst, so this record helps fill a gap in the central Virginia distribution. A photo was deposited in the VHS Archive (#751) as a voucher for this observation.

Jennifer Clark
Appomattox, VA

***Thamnophis saurita* (Common Ribbonsnake)**: VA. Stafford County, approximately 0.2 km. down the Accokeek Overlook Trail at the Brooke Road access site of Crow's Nest Natural Area Preserve (38.36991, 77.32787). 3 April 2023. Anna Dustin.

County Record: The Common Ribbonsnake is semiaquatic, inhabiting a variety of habitats, but mostly mesic, throughout Virginia except for the western mountains. Major prey items include amphibians and small fish (https://www.virginiaherpetologicalsociety.com/reptiles/snakes/common-ribbonsnake/common_ribbonsnake.php). Here I report the first record of a Common Ribbonsnake from Stafford County. On 3 April 2023 While birdwatching on the Accokeek Overlook Trail (hereafter "the trail") situated at the Brooke Road Access site of Crow's Nest Natural Area Preserve, I observed a Common Ribbonsnake. The snake was startled by my presence and quickly moved from leaf litter adjacent to the trail and out of my sight. The habitat can be described as deciduous (Quercus spp. and Fagus grandifolia) with dense briar (Smilax rotundifolia) and holly (Ilex opaca) understory. May apple (Podophyllum peltatum), downed woody debris and leaf litter made up a majority of the ground cover. To the north of the trail, the slope of the land increases and meets Brooke Road within fifty meters. To the south of the trail, Accokeek Creek meets the land's surface and creates a wet bottom before tidal influences begin.

I was able to get a digital photograph of the snake and sent it to the VHS as a voucher for this report (Archive #728). Surrounding Counties for which there are verified records include Fairfax to the north, King George to the east, and Spotsylvania and Culpeper to

the south. This find helps fill a gap in the distribution in northern Virginia.

Anna Dustin

***Thamnophis saurita* (Common Ribbonsnake)** VA: Mecklenburg County, Dick Cross Wildlife Management Area (36.616208,-78.277402). 7 March 2023. Henry Nase.

County Record: The Common Ribbonsnake has a wide distribution in eastern Virginia. It is verified in 46 of the 95 counties. It has not been reported, previously, from the southern tier of counties in central Virginia. On 7 March 2023 I was walking a trail at Dick Cross Wildlife Management Area in Mecklenburg County when I saw a Common Ribbonsnake moving from a pond to an open field. I captured and photographed the snake prior to releasing it. A digital photograph was sent to the VHS to voucher this observation (VHS Archive #746). It has been reported from Charlotte County to the northwest. This record helps fill a gap in the distribution of the Common Ribbonsnake for southcentral Virginia.

Henry Nase

***Thamnophis saurita* (Common Ribbonsnake)**: VA. Isle of Wight County, Smithfield (37°02'36"N 76°43'30"W). 8 May 2023. Brent Hodnett.

County Record: The Common Ribbonsnake is found widely in Virginia. It has not been verified in the western mountains and only in scattered counties in the central Piedmont. This is a semiaquatic species (https://www.virginiaherpetologicalsociety.com/reptiles/snakess/common-ribbonsnake/index.php) inhabiting a wide variety of wetland habitats where it preys on anurans, salamanders and small fishes found in these habitats.

On 8 May 2023 I was out for a morning walk at our farm in Isle of Wight County. We have a few shallow ponds on the edge of the woods on the south side of the property. I have encountered a few copperheads there in the past so I try to pay attention to where I am stepping. This Ribbonsnake just happened to be crossing my path, so I stopped to take a few pictures and then we each went our separate way. I noticed the VHS distribution map for the Common Ribbonsnake did not include Isle of Wight County so I sent some

of the photos to the Herp ID page as a voucher (VHS Archive # 739). The Common Ribbonsnake is recorded from all surrounding counties so this observation helps fill a gap in the distribution.

Brent Hodnett
Smithfield VA

***Thamnophis sirtalis* (Eastern Gartersnake)** VA. Williamsburg, 6667 Richmond Rd. 16 January 2023. Rich Montgomery.

Early Activity: Mitchell (1999. The Reptiles of Virginia. Smithsonian Institution Press, Washington DC. 352 pp.) reports the earliest activity for the Eastern Gartersnake is 28 January. On 16 January 2023 I was walking in the woods by my home and saw one. It did not move when I approached, and I was able to obtain a photograph. The temperature was unusually mild, about 13°C that afternoon. This moves up the earliest reported activity by almost two weeks. The winter of 2022-2023 is so mild a number of early activities might be expected. A photograph of the Gartersnake was submitted to the VHS Archive (#717).

Rich Montgomery
Williamsburg VA

***Thnamophis sirtalis* (Eastern Gartersnake)**: VA. City of Radford (N 37.12700°, W 80.58874° W) 9 May 2023' Nick Buchbinder and Kalee Shahayda.

City Record: The Eastern Gartersnake is widely distributed in the eastern United States, and has a State-wide distribution, being verified in 85 of the 95 Counties and 14 Cities in Virginia. On 9 May 2023 Kalee Shahayda and I were looking for snakes along the railroad tracks running along the east side of the New River on the southwest portion of Radford. Upon flipping some loose railroad ties, we found two Eastern Gartersnakes inside the ties. We took some photographs and sent them to the VHS (Archive #744) as a voucher for our observation. The Eastern Gartersnake is verified in Montgomery and Pulaski Counties to the east and west of Radford, so this observation helps fill a gap in the distribution in western Virginia.

Nick Buchbinder
Radford, VA

***Virginia valeriae valeriae* (Eastern Smooth Earthsnake).** VA: Greene Co., 204 Hall Drive, Barboursville, (38.1947164, -78.3866720) 10 October 2022. Lane D. Gibbons

Eastern Smooth Earthsnakes (*Virginia valeriae valeriae*) are found in a variety of mesic to xeric habitats, including hardwood, mixed, and pine forests/woodlands, dry upland ridges, and wet lowlands, as well as old fields, and both suburban and urban woodlots (https://www.virginiaherpetologicalsociety.com/reptiles/snakes/eastern-smooth-earthsnake/eastern_smooth_earthsnake.php). They are commonly found beneath surface objects but spend most of their time underground (Op. Cit.). The species is scattered wildly throughout the state, often with substantial gaps between county occurrences, but it is absent from the Eastern Shore and largely absent from the southwest Appalachian Plateau, Ridge and Valley, and Blue Ridge provinces. This record documents a first report for the species in Greene County.

Two specimens were discovered on the steep slope of an intermittent drainage, beneath leaf litter and grassy substrates while hand-clearing a dense population of Japanese stiltgrass (*Microstegium vimineum*). Multiple photographs were taken before the snakes were released into adjacent leaf litter. The area is dominated by mixed hardwood forest with ample coarse woody debris and substrates dominated by oak (*Quercus*) and beech (*Fagus*) litter. Soils are primarily dry-mesic. Photographic vouchers were submitted to the VHS (Archive #726), and identification was graciously confirmed by the VHS. These observations were made on October 10, 2022, at 1730. This record for Greene County contributes to filling a north central Virginia gap in the distribution of this species. Daytime weather: Clear Sky; Temperature, high of 21°C; Relative Humidity, low of 26%; Winds, predominantly southeast, avg. 2mph; Precipitation, 0cm.

Lane D. Gibbons
Barboursville VA

Virginia valeriae **(Eastern Smooth Earthsnake)**: VA. Appomattox County, Spout Spring off US 460 Salem Road. 19 May 2023. Heather Maezono.

County Record: The Eastern Smooth Earthsnake has a wide distribution in eastern Virginia (https://www.virginiaherpetologicalsociety.com/reptiles/snakes/eastern-smooth-earthsnake/index.php). This is a small secretive snake which spends much of its time underground so it may not be noticed even when prevalent. On 19 May 2023 I was digging in a mulch pile and unearthed an adult Smooth Earthsnake. I took several photos prior to releasing it. A digital photo was sent to the VHS Archive (#748) as a voucher for this observation. The Smooth Earthsnake has been verified in Campbell and Amherst Counties to the west and Buckingham to the east, so this record helps fill a gap in the distribution in central Virginia

Heather Maezono
Spout Spring, VA

Virginia valeriae **(Eastern Smooth Earthsnake):** VA. Appomattox County, Appomattox, Route 24 (37.452908,-78.716956). 3 June 2023. Jennifer Clark.

Confirmation of County Record: The Eastern Smooth Earthsnake has a distribution in Virginia in the eastern and central portions of the state. It is small and secretive, easy to overlook. On 3 June 2023 I was cleaning up an area to create a garden and found an adult Eastern Smooth Earthsnake under some leaves, by the edge of a woods. A photo was taken prior to releasing the snake, and sent to the VHS for identification (Archive # 750). I was informed another specimen had just been received as the first verification for Appomattox County, so this record confirms the first report (Maezono, H. 2023. Virginia valeriae, Record for Appomattox County. Catesbeiana 43(1):56).

Jennifer Clark
Appomattox, VA

Virginia valeriae **(Smooth Earthsnake)**: VA. King George County, Weedons Fork near the intersection of Kent Rd and Ascot Close Dr. 20 April 2023. Sam Whay.

County Record: The Smooth Earthsnake is a small secretive snake spending much of its time underground so it may be present

without being observed (https://www.virginiaherpetologicalsociety.com/reptiles/snakes/eastern-smooth-earthsnake/index.php). Its primary diet is earthworms but can also prey on various invertebrates found under rocks and logs. The range is primarily found in the eastern two-thirds of Virginia although there is a record in Scott County in the west.

I live in King George, VA. and offer a free snake relocation service. On 20 April 2023 I was called to move a snake. Unfortunately, before I arrived one of the homeowners killed the snake. I took photos of the body (couldn't find the head) but suspected it was a Smooth Earthsnake. The Virginia Wild Snake ID Facebook group agreed, but I sent the photos (VHS Archive # 740) to the VHS ID page for verification. I was informed the Smooth Earthsnake had never been verified for King George County. It has been documented in all surrounding counties except Essex to the south, so this record helps fill a gap in the distribution.

Sam Whay
King George, VA

***Chelydra serpentina* (Snapping Turtle)**. VA: City of Franklin. Near the intersection of South St and Broad St (36°40'21"N, 76°55'07"W). 16 April 2023. Mike Blythe and Amy Lehman.

City Record. On 16 April 2023 Mike Blythe and I were searching for herpetofauna in a ditch when Mike spotted a large turtle in the water. The turtle was captured in a net, photographed, and released at the same site. It appeared healthy and exhibited typical behavior (e.g. attempting to bite). I submitted photos to VHS to confirm the identification (VHS Archive #737). The Snapping Turtle has been verified in ninety (90) counties and eighteen (18) cities, including both adjacent localities (Southampton County and Isle of Wight County), so this observation fills a gap in the species distribution. The weather for this observation was cloudy and 27°C.

Amy Lehman
Southampton County

Clemmys guttata - Spotted Turtle - Richmond County, Rappahannock National Wildlife Refuge, location withheld. 24 February 2022, Karl R. Kratzer

According to the Virginia Herpetological Society Website, Spotted Turtles have not been confirmed in Richmond County. This record fills a data distribution gap for Richmond County. Spotted Turtles have been confirmed in Lancaster, Westmoreland and Northumberland counties which surround Richmond County. Pictures were taken at noon (VHS Archive # 723), the temperature was about 17°C, clear sunny skies, breezy.

This turtle was found sunning himself on the bank of a vernal pool that is part of a multi-year study focused on Spotted Salamanders (Ambystoma maculatum) and Wood Frogs (Lithobates sylvaticus) use of ephemeral pools. Although early in the egg laying season, no egg masses were located in this pool. Volunteer observers are asked to note any other species of interest that may be using the ephemeral pool. This is an interesting species to this observer.

Karl Kratzer
Hayesa, Virginia 23272

Pseudemys concinna **(Eastern River Cooter)**: VA. Franklin County, Smith Mountain Lake (37.1434500, -79.7193300). 14 May 2023. Nicklas Buchbinder

County Record: The Eastern River Cooter in Virginia has a wide distribution in the Piedmont Physiographic Province. There are many records from the James and Roanoke River drainages (https://www.virginiaherpetologicalsociety.com/reptiles/turtles/eastern-river-cooter/index.php). This is a species that frequents large rivers and lakes. On 14 May 2023 I was in a boat on Smith Mountain Lake, looking to photograph turtles and birds. I had previously seen River Cooters on the Lake and knew they had not been previously reported, so I was hoping to secure a photo for a voucher for Franklin County. Smith Mountain Lake was formed when the Roanoke River was dammed. The river separates Bedford County to the north and Franklin County to the south, and the Eastern River Cooter has not been reported for either. I was able to secure photographs of a River Cooter basking on a log on the southern side of the lake, which was submitted to the VHS (Archive #746) as a voucher for this observation. Eastern River Cooters have been reported from Pittsylvania County to the east and Montgomery and Pulaski Counties to the west, so this record helps fill a gap in the distribution in southcentral Virginia.

Nicklas Buchbinder
Radford, VA

***Pseudemys concinna* (Eastern River Cooter):** VA. Frederick County, Lake Frederick (39.059486, -78.164960). 26 November 2022. Suzy and Tom Oliver.

New County Record: The Eastern River Cooter has a widespread distribution in Virginia. Most records are from the piedmont physiographical province, but there are some from the far southwest and central coastal plain. Here, we report the first instance from northern Virginia, in Frederick County. On 26 November 2022 we were canoeing on Lake Frederick, and noticed a turtle which was larger than the Eastern Painted Turtles we usually see, and photographed it. We were surprised to see turtles sunning on logs so late in the year but the weather was sunny and the temperature near 13°C. We were not sure of our identification since the Eastern River Cooter is not verified from any of the surrounding counties in northern Virginia, but the VHS Herp ID webpage confirmed the identity. With the sighting of only a single specimen, it is possible this turtle was an introduction so others should keep an eye out for large turtles in Frederick County to confirm their presence. A digital photograph was submitted to the VHS Archive (# 702) as a voucher.

Suzy and Tom Oliver
Winchester, VA

***Trachemys scripta elegans* (Red-eared Slider):** VA. Franklin County, Smith Mountain Lake (37.17042° N, 79.72387° W). 3 June 2022. Nick Buchbinder.

New County Record: The Red-eared Slider has a state-wide distribution, being reported thus far in 36 Counties. This species is not native to Virginia but was widely sold in the pet trade resulting in many specimens being released into area ponds and lakes when they grew too large to be conveniently cared for. Breeding populations have been reported from all over Virginia and the Virginia Department of Wildlife Resources has declared them now to be naturalized.

On 3 June 2022 I was boating on Smith Mountain Lake looking for wildlife and spotted a Red-eared Slider basking on a log beside an Eastern Painted Turtle. I photographed the turtles, and sent a copy of the photo to the VHS Herp ID website. I was told there was no record for the Red-eared Slider for Franklin County. This record helps fill a gap in the distribution in south-central Virginia. A digital copy was deposited in the VHS Archive (# 703) as a voucher.

Nick Buchbinder
Radford, VA

Trachemys scripta scripta (Yellow-Bellied Slider). VA: City of Franklin. GMAX Industries, Inc., Pretlow Industrial Park, 221 Progress Pkwy (36°39'24"N, 76°55'36"W). 23 February 2023. Mike Blythe and Amy Lehman.

City Record. On 22 February 2023, Mike Blythe and I placed a floating turtle trap in the retention pond next to a warehouse in Pretlow Industrial Park. We retrieved the trap the following evening and caught two (2) turtles. We photographed the turtles and released them at the same site. I submitted photos to VHS to confirm the identification (Archive #722). The Yellow-Bellied Slider has been verified in seventeen (17) counties and eight (8) cities, including both adjacent localities (Southampton County and Isle of Wight County), so this observation fills a gap in the species distribution. The weather for this observation was partly sunny and 27°C.

Amy Lehman
Southampton County

Scincella lateralis (Little Brown Skink). VA: City of Franklin. Waste Water Treatment Plant, S Main St (36°40'16"N, 76°55'04"W). 10 February 2023. Mike Blythe and Amy Lehman.

City Record. Mike Blythe and I were searching for herpetofauna in a wooded area behind the Franklin Waste Water Treatment Plant when we disturbed a small skink under the leaf litter. We captured the skink to take photos and released it at the same site. The

skink was approximately 10cm long. I submitted photos to VHS to confirm the identification (Archive #720). The Little Brown Skink has been verified in fifty-two (52) counties and eight (8) cities, including both adjacent localities (Southampton County and Isle of Wight County), so this observation fills a gap in the species distribution. The weather for this observation was cloudy and 22°C.

Amy Lehman
Southampton County

President's Corner

Dear Members of VHS,

My presidency is coming to an end in the next six months, and I'd like to use this last president's corner as a reflection on the goals I came into this position with and the accomplishments of our society during my term. The two main goals these past couple of years have been membership engagement and modernizing the bylaws. While the goal of membership engagement is vague, we have had the most progress here with the expansion of the education committee, increased diversity in the locations of surveys, and improved membership management software. Changing the bylaws is a slow-moving process and we are getting there. All of these accomplishments are a group effort and none of them would have had a hope of being completed or started without the wonderful people who volunteer their time and effort.

The education team continues to do an excellent job. When members ask to be more involved, we are now able to direct them to the education team where they can attend events and help educate the public. There are multiple education events every month, so there are plenty of opportunities for involvement.

In past president corners, I mentioned the pelagic trip which was chartered after extensive polling and budget approval processes. A condition of this chartering was that we would need to sell every ticket in order to break even. Despite polling interest, we were unable to sell the number of tickets needed and had to cancel the boat. It may be that our membership is unable to support such a trip (whether that be interest, money, transportation, etc.), but I think there is still merit to promoting opportunities and perhaps partnering with another organization to fill a boat. This trip was meant to share wildlife experiences with members, and I believe it is worth the leg work to organize a variation of this in the future that works best for our membership.

Our 2023 spring meeting was also organized with membership experiences in mind. Southwestern Virginia is a hotspot for salamanders, and much of our membership exists in Central and Northern Virginia. We worked with the Blue Ridge Discovery Center, a locally owned refurbished school, lodge, and wildlife education center, to provide a comfortable stay and meeting facility in a prime location for endemic salamanders. Most people who attended our spring meeting left having seen a new species and had the opportunity to visit a new part of the state.

We also issued many grants towards research and conservation of our native herpetofauna and created a page on our website with past awardees. The VHS does so much, and I felt that our grants program was not highlighted enough. Hopefully, this transparency will help communicate with members the extent to which we contribute to valuable research within the state and encourage others to apply for our program.

The proposed bylaw changes were distributed and reviewed at this past spring meeting. The executive committee will have a special meeting to discuss any changes and, if all goes well, we will vote on these changes as a society at the fall meeting. If you are at all interested in having a say in the structure

of the society, please plan to attend our fall meeting. Your involvement is highly encouraged!

The above accomplishments would not have been possible without the many people who donate their time to the VHS. Together we have made great strides toward increasing membership engagement and modernizing the bylaws. I hope to be able to pass some key changes made to the bylaws at the fall meeting, but, if we are unable to vote during the fall meeting, I will continue to work on this effort. Being President has been a pleasure, and I feel I've truly gotten to know the many wonderful people who make this organization run. If your feel that you want to throw your hat in the ring for any elected positions, please don't hesitate to reach out!

Sincerely,
Erin C. Anthony

VHS Spring Meeting Minutes
Blue Ridge Discovery Center - Troutville, VA
27 May 2023

This year, the meeting was held at the Blue Ridge Discovery Center in Troutdale, Virginia on the 27th of May 2023. The committee members in attendance were the treasurer Matt Close, secretary Yohn Sutton, bioblitz survey committee Jason Gibson, outreach committee Kelly Geer, education committee Caroline Seitz, *Catesbeiana* proprietor Paul Sattler, and the honorable president Erin C. Anthony.

The meeting was started with a review of the draft to changes of the bylaws of the society that were amended to update language and modernize the use of the Articles of Incorporation. Key changes noted by the president were the use of the term "native" to differentiate between pet ownership and actual native species when referring to the purpose of the Virginia Herpetological Society and native reptile conservation. The goal of the language change and editing of the articles was to further educate members and add inclusion for members of any type to the society. The proposed amendments will be voted on at the 2023 fall meeting by the committee members, and future amendment changes and voting digitally will be permissible.

Erin would like to give a big thank you of appreciation to Paul, Jason, and Matt for information regarding survey locations and the potential fourteen species of salamander found during this year's survey.

Kory Steele was absent at the meeting, but relayed grant awarded information has been posted through 2016.

For permits, Susan Watson was absent for the meeting, but relayed that everyone in the ex comm should have received the amended Scientific Collections and Exhibitor's permits. Any recent survey data should be emailed to Susan so it may be entered on the DWR online reporting system.

The VHS would like to welcome Clinton Markwell to the Newsletter committee. Clinton was not in attendance; but would like to plan on his behalf, to have a newsletter generated on before each business meeting. Catesbeiana will still be in use to publish information regarding business meetings.

Outreach committee with Kelly Geer who was in attendance, reported 493 active members in the society. There were 53 new members added to the list as of 2023. The use of stripe to sign up for membership has been largely successful. Members have the option to renew their membership as needed and not be bound to renewal that paypal had automatically done. The fees for stripe are embedded in the membership fees; three percent of the fees go towards processing fees per transaction. The use of LGL can be used as ways for members to communicate with one another. One of the perks of allowing members who live in different locations of Virginia to communicate is to allow carpooling to survey sites or group lodging as options for members who must take extended trips to get to survey sites or meetings. With the growing size of the VHS, one suggestion is to allow members access to spots for surveys before the general public. This is intended to be an incentive for members.

Merchandise chair is still vacant. Erin was overseeing merchandise and John White (not present) has taken the roll of the website store. John is however looking for a manager

to oversee the VHS store on zazzle. Scam resources have been using the VHS facebook site to sell unauthorized merchandise, this needs to be addressed and monitored.

There are no topics for the legislation committee currently and Larry Mendoza was not in attendance.

There are no new topics from the conservation committee. There is still a need to determine the focus of this branch and Erin suggested one start would be to oversee the ongoing box turtle counts. A suggestion was to use the spadefoot monitoring dataset as an example to refine the box turtle counts and manage the data sets every two years. The main objective is to allow research to be done with the statistical datasets.

For the survey committee, Jason Gibson residing, commented that five surveys had been completed so far in 2023. The Powhatan bioblitz had an attendance of forty individuals and Back bay bioblitz had five individuals in attendance, two of which were VHS members. There is an additional private survey only opened to ex comm members at Prince George County soon.

Paul Sattler acknowledges that volume 43 of *Catesbeiana* is in good shape for publishing. Two of the major articles are reviewed and revised as needed. Still awaiting for the third article. There have been thirty field notes that were completed, and another 6-8 notes that need additional information. The sources for those have been contacted. The minutes, treasurer's report, and President's corner notes will be needed within the next couple of weeks. Matt Becker is resigning as Coeditor of *Catesbeiana* and Dr. Sattler will continue as the primary editor with the President's approval. No objection was given, therefore Paul may continue as the primary editor. There is no solicitation for a new co editor currently. The use of Herp ID has been successful in sending field notes and thank you to Bonnie and John for setting up the reporting system.

Caroline Seitz with the education committee has reported twenty-three programs done since the first of October. Different variations of programming included virtual, exhibits at libraries, table exhibits at shows, and programs with cub scouts reached over 5,815 people. Many thanks to Travis and Larry for the major contributions and time put forth to make a lot of these educational events happen. There are currently twenty-two members in the education committee with five reported active members contributing to programs and outreaches. Caroline has requested a separate education committee meeting during the fall meeting to discuss the commitment necessary to run the largely successful program. Due to the high level of programs done, supplies are again scarce and need replenishing. Items such as pens and stickers were a successful tool to get the VHS logo out to individuals, as well as the use of the Department of Wildlife Resources (DWR) information guides on native reptiles and amphibians. More poster display boards, tablecloths, toys, stickers, and business cards are all in need and are optimal tools to communicate education with the public. An observation from the programs made was the high interest in snakes from the public through general conversation and educational messaging. With this strategy in mind, the use of live animals is not necessary to belay the message of conservation, recreation, and education of reptiles and amphibians; this also lends to an increasingly humane method of teaching at outreach events. There is still work on getting training kits for the education team that will also include brochures and various ways to identify reptiles and amphibians for public education.

Matt Close provided the Treasurer's report at the meeting and reported there are three different accounts the VHS uses that need to be managed cohesively. There are some payments that do not appear to get processed through Stripe as expected; member dues or payments will appear as pending and not fully processed as needed. A remedy to the issue in the works. This year's budget was at a net positive balance of $21,774.76. The income from dues and contributions still makes up the majority as the source for the positive balance. The costs for food and providing an award for member of the year in the fall of 2022 was around $1,419.50; the contributions during the auction and sales of VHS merchandise paid for the fall meeting in full. All the insurance and state filings are accounted for and three grantees each received 1,500 dollars in grants from the VHS. There was a deal conducted to get new snake hooks for $537.00, this was below the retail prices for field equipment. Although Amazon Smile is being discontinued, the VHS still received 371.00 dollars in contributions. One major expense for the society is the "Silver sponsor" level at the Joint Meeting of Ichthyologists and Herpetologists which cost $800.00. The benefit of the program outweighs the cost since there will be representatives from the VHS in attendance at the event; branding and logos will be used to continue gaining interest from the public about the Virginia Herpetological Society. The cost for the 2023 spring meeting and survey was $481.52. Creating a budget for different sections of the VHS will be proposed to committee members in the next fall meeting. Part of the budgeting strategy is to streamline requests for funds and allocate money where needed. The society should take into consideration that money for surveys may be necessary for equipment. A proposal to add a nominal registration fee for meeting attendees will assist with having the opportunity to be a more communal group that can fund initiatives easier than usual. Another proposal is to limit the president's spending allotment to under 500.00 without committee approval and anything above would require a 2/3 majority vote from the committee.

The website report was given by John White who was not present at the meeting. John is inquiring if anyone could take over the website store on zazzle. There was a complement that members at the Powhatan Bioblitz were wearing the new VHS shirts. There was a total of 261 identification requests from 1 January 2023 to 23 May 2023. The breakdown is as follows:

Frogs: 23
Salamanders: 14
Lizards: 22
Snakes: 147
Turtles: 28
New county records: 26

Though Mike Clifford is retired, he is still active on the ID requests for the society. There is work in progress to create and post US range maps for Native frogs and toads. Other works are a salamander identification key and amphibian egg IDs in the future.

For new business, the president is requesting at least three ex committee members to assist in an election committee. Jason Gibson volunteered to be part of the Election Committee. There is a fundraiser set up with a local mead brewery to sponsor a VHS themed beverage. More to come at the next meeting. There is a proposal to have the 2023 fall meeting at the Virginia Museum of Natural History in Martinsville, Virginia. Committee members are working on the logistics and hope to report back by June 30th.

Yohn Sutton

Virginia Herpetological Society
Treasurer's Report
June 16, 2023

Previous Balance-November 11, 2023	$	20,405.60
Receipts		
Dues	$	3787.93
One-Time Donations	$	1,829.00
Fall 2022 Meeting Auction and Merch	$	1,647.01
Spring 2023 Meeting Merch	$	25.00
Amazon Smile	$	371.87
Expenses (11/12/2022-06/15/2023)		
2023 VHS Grants Awarded (3)	$	1500.00
Survey Equipment and Supplies	$	541.11
Educational Materials	$	955.57
Promotional and Outreach Materials, Merchandise	$	1,068.36
Tabling Events	$	850.50
VHS Meetings		
Fall 2022 Meeting	$	1419.50
Spring 2023 Meeting	$	656.52
JMIH Norfolk 2023 Sponsorship	$	1250.00
Awards (2023 Photo Contest)	$	150.00
Postage	$	40.24
VA SCC Filing	$	25.00
Service Fees and Refunds (Paypal, etc.)	$	353.29
Current Available Balance	$	19,256.32

VHS Memberships (dues current)
Regular: 388
Student: 17
Lifetime: 95

Total 500

Matthew Close
VHS Treasurer

Field Notes

The Field Notes section of *Catesbeiana* provides a means for publishing natural history information on Virginia's amphibians and reptiles that does not lend itself to full-length articles. Observations on geographic distribution, ecology, reproduction, phenology, behavior, and other topics are welcomed. Field Notes will usually concern a single species. The format of the reports is: scientific name (followed by common name in parentheses), state abbreviation (VA), county and location, date(s) of observation, observer(s), data and observations. The name(s) and address(es) of the author(s) should appear one line below the report. Consult the editor if your information does not readily fit this format. **All Field Notes must include a brief statement explaining the significance of the record** (e.g., new county record) **or observation** (e.g., unusual or rarely observed behavior, extremely early or late seasonal record, abnormal coloration, etc.). Submissions that fail to include this information are subject to rejection. Relevant literature should be cited in the body of the text (see Field Notes in this issue for proper format). All submissions will be reviewed by the editor (and one other person if deemed necessary) and revised as needed pending consultation with the author(s).

If the Field Notecontains information on a **new county (or state) record**, **verification is required in the form of a voucher specimen** deposited in a permanent museum (e.g., Virginia Museum of Natural History) or a **photograph** (print, slide, or digital image) **or recording** (cassette tape or digital recording of anuran calls) deposited in the archives of the Virginia Herpetological Society. Photographs and recordings should be sent to the editor for verification and archiving purposes; the identity of voucher specimens must be confirmed by a museum curator or other qualified person. Include the specimen number if it has been catalogued. Prospective authors of distribution reports should consult Mitchell and Reay (1999. *Atlas of Amphibians and Reptiles in Virginia*), Mitchell (1994. *The Reptiles of Virginia*), and Tobey (1985. *Virginia's Amphibians and Reptiles: A Distributional Survey*) **[both atlases are available on-line on the VHS website]** as well as other recent literature to determine if they may have a new county record. New distribution records from large cities that formerly constituted counties (Chesapeake, Hampton, Newport News, Suffolk, and Virginia Beach) are acceptable, but records from smaller cities located within the boundaries of an adjoining county will only be published if the species has not been recorded from that county. Species identification for observational records (e.g., behavior) should be verified by a second person whenever possible.

PHOTOGRAPHS

High contrast photographs (prints, slides, or digital images) of amphibians and reptiles will be considered for publication if they are of good quality and are relevant to an accompanying article or field note. Digital images are preferred. Prints should be on glossy paper and no larger than 5 x 7 inches. Published photographs will be deposited in the Virginia Herpetological Society archives.

Paul Sattler, Editor
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